



Kentucky Fluview H1N1 Response Summary Report

2009 was a year bracketed by two major public health responses. In January, Kentucky experienced the sudden occurrence of an ice storm. Then a novel form of influenza, H1N1, emerged in April. Both incidents tested the public health system in Kentucky. But we were ready. A prepared workforce, tested and organized response plans, and a robust network of public and private partners led to a rapid and effective response to the events of 2009. This final issue of *Fluview* focuses on the trajectory of 2009-2010 H1N1 pandemic and our public health response.

In late April 2009, the World Health Organization declared a "public health emergency of international concern" when the first two cases of the H1N1 virus were reported in the United States, followed by hundreds of cases in Mexico. Fears arose that swine flu would become a major global pandemic at the end of 2009 with high illness and fatality rates similar to the influenza pandemic in 1918. Many nations, including the United States, worked diligently on planning and executing major vaccination campaigns to protect their citizens. This influenza virus was unusual given higher infection rates among young and middle-aged adults.

Although the emergence of novel H1N1 influenza was unexpected, Kentucky's public health system was prepared through the pandemic influenza plan that was already in place, the gathering of over 1,200 stakeholders for a Pan Flu Summit September 3, 2009, and the continual development of preparedness plans through system exercises. To respond to H1N1, Kentucky relied upon a tested and organized response effort.

One of the main challenges facing the Kentucky public health system during this pandemic was managing the outbreak while waiting for vaccine to arrive. Each year the Kentucky Department for Public Health encourages Kentuckians to receive a seasonal influenza vaccination which contains the three flu strains expected to be common in the upcoming flu season. However, the vaccine manufacturing process, which takes many months to complete, was already well underway when the H1N1 strain emerged. It was simply too late to be part of the 2009-2010 three-part seasonal vaccine. Thus, vaccine manufacturers struggled to rapidly produce H1N1 vaccine, as the public health system put in place a rapid response and vaccine distribution system. When the vaccine became available, the Kentucky Department for Public Health and the local health departments worked hand-in-hand to distribute and vaccinate our citizens against novel H1N1 influenza. By May of 2010, the Kentucky public health system composed of both public and private organizations, was able to distribute 1.2 million doses and vaccinate an estimated 25% of the population.

Thankfully, the fatality rate from novel H1N1 was not as high as initially feared: as of May 21, 2010, at least 18,097 deaths world-wide were attributed to the strain of which only 282 were pediatric. In Kentucky 41 people died from lab-confirmed H1N1. However, the pandemic still required a tremendous effort on the national, state and local levels. We hope that this document will adequately summarize for you the course of the novel H1N1 pandemic in Kentucky, and illustrate the public health effort to provide information to decision makers and the public, to collaborate with our many partners, and to institute control measures to contain the outbreak. There were many keys to the success of this response such as public health and public information hotlines, a massive vaccination campaign, a program to provide antiviral medications to those who could not afford them, and provision of medical supplies and protective equipment that were in short supply. In my estimation, the citizens of Kentucky were served well by the public health practitioners of Kentucky. We hope that in reading this last issue of Kentucky *Fluview* that you agree. Thank you to all who contributed to and continue to the fight against novel H1N1 influenza in the Commonwealth.

William Hacker, MD, FAAP, CPE

Kentucky Fluview

June 2010

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Surveillance and Epidemiology

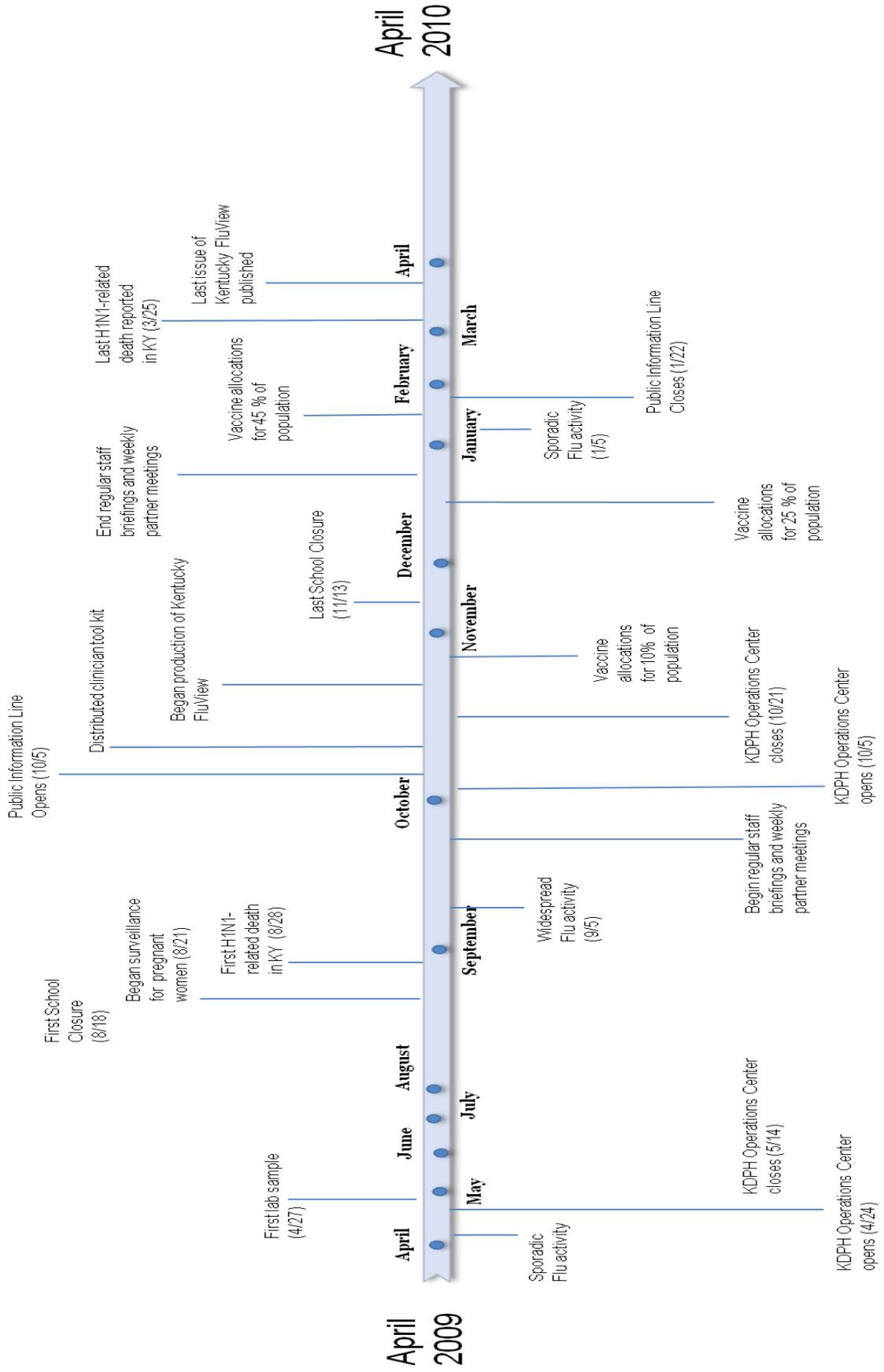
Public health practice starts with two essential functions. First, is to monitor the health status of the population. Second, is to diagnose health problems and health hazards in the community. This section describes how during the H1N1 response, the Kentucky public health system:

- **Monitored and investigated deaths and reports of illness**
- **Conducted laboratory tests to determine which virus types were in circulation**
- **Monitored school closures and absenteeism rates**
- **Tracked the health of pregnant women—a high risk population**

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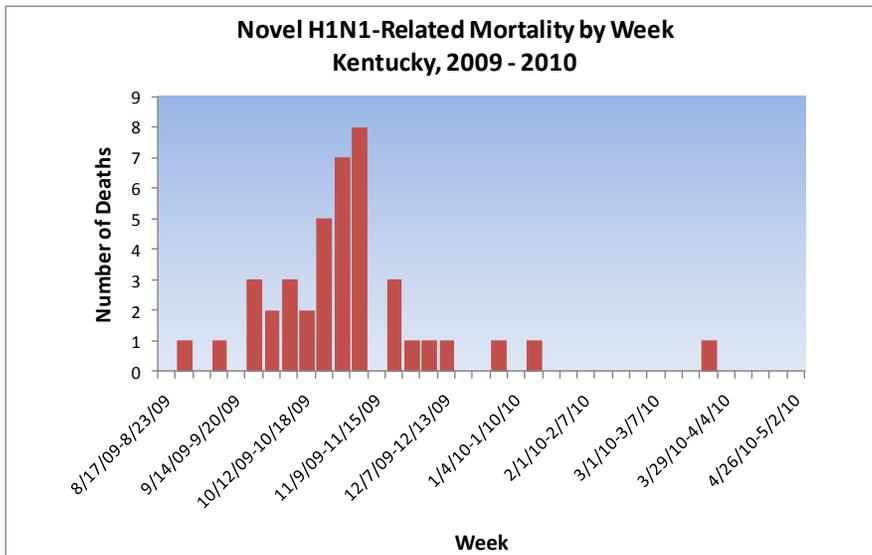
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Timeline



Mortality Surveillance

Throughout the 2009-2010 H1N1 pandemic, the Kentucky Department for Public Health (KDPH) monitored influenza using various surveillance measures, including mortality. To collect information regarding H1N1-related mortality, KDPH sent notifications to all hospitals, local health departments, coroners, and medical examiners throughout the state. They were instructed to report any suspected or confirmed H1N1-related fatality to their local health department or KDPH. In addition, the Director of the KDPH Division of Laboratory Services (DLS) worked with the Chief Medical Examiner to develop H1N1 post-mortem testing guidance for all medical examiners. The Epidemiological Response Coordinator in the Preparedness Branch of KDPH also worked with the KDPH DLS Director and the Chief Medical Examiner to develop post-mortem testing guidance for coroners across the state. This collaboration strengthened communications and relationships between KDPH, medical examiners, coroners, local health departments, and hospitals throughout Kentucky. The H1N1 post-mortem testing guidance included signs and symptoms of H1N1 infections with a description of severe complications, which also assisted coroners in their investigations of sudden unexplained death that may have been attributed to H1N1 infections.

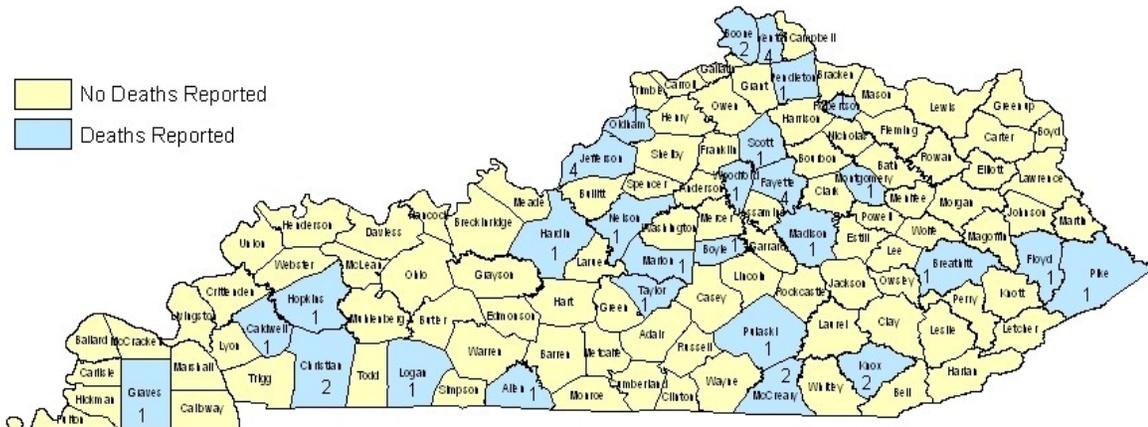


The total mortality count in Kentucky for H1N1-related deaths throughout the 2009 H1N1 pandemic was 41 deaths.

Deaths by County

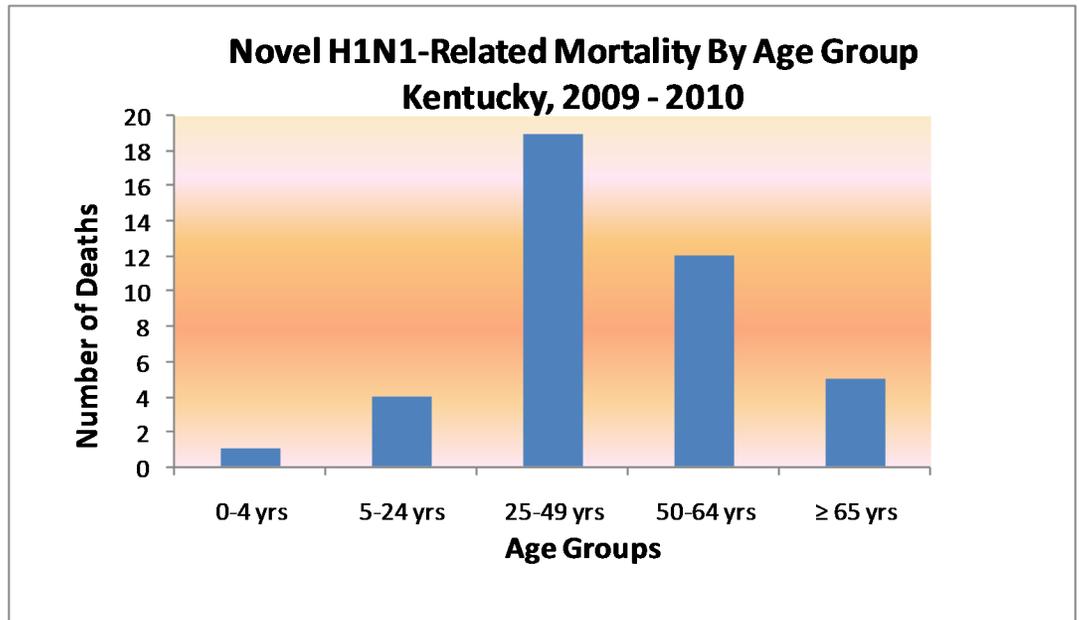
The map below displays the final H1N1-related death count (41 mortalities), according to the patient’s county of residence. An H1N1-related death occurred in the following counties: Allen, Boone, Boyle, Breathitt, Caldwell, Christian, Fayette, Floyd, Graves, Hardin, Hopkins, Jefferson, Kenton, Knox, Logan, Madison, Marion, McCreary, Montgomery, Nelson, Oldham, Pendleton, Pike, Pulaski, Robertson, Scott, Taylor, and Woodford.

Number of Deaths Attributed to H1N1 by County, August 1, 2009 – April 1, 2010



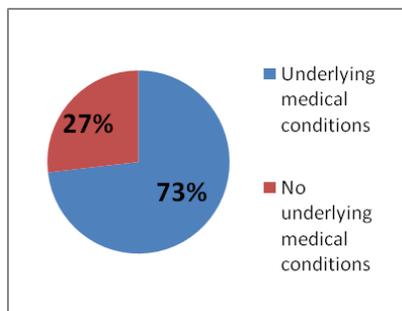
Mortality Risk

The characteristic of novel H1N1 influenza that most concerned clinicians, researchers, and public health officials was the particularly young age distribution of deaths. Some criticism of the World Health Organization (WHO) arose due to their early declaration of a pandemic because in the end millions fewer deaths resulted from the H1N1 strain compared to the three previous pandemics of 1918, 1957, and 1968. However, these mortality figures are not comparable for a few reasons. First, the WHO laboratory-confirmed data represents the ‘tip of the iceberg’ in terms of all influenza-related deaths. In the past, mortality estimates were based on all-cause mortality throughout the pandemic period. These estimates were far more inclusive than the more recently lab-confirmed death measurement during the 2009 H1N1 pandemic. Second, although the average seasonal flu causes nearly 36,000 U.S. deaths compared to the estimated 12,000 worldwide deaths related to H1N1 influenza, the majority of pandemic deaths have occurred in younger adults as opposed to seasonal flu strains where nearly all mortality occurs in the elderly. The mean age of the H1N1-related deaths was forty-five years old, with a range from one to eighty. The age group with the highest mortality was the 25-49 year-old category, which has been a consistent pattern throughout the pandemic in Kentucky.

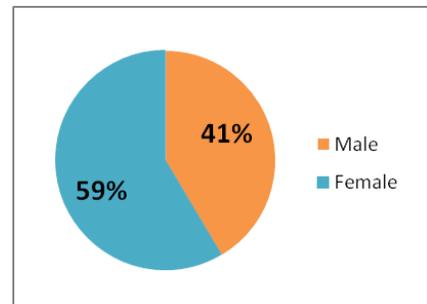


Deaths with Underlying Medical Conditions vs. Those Without Underlying Medical Conditions

Of the patients whose deaths were related to H1N1 in Kentucky, 30 of 41 had underlying medical conditions. Some of the most commonly reported were asthma (10), hypertension (11), morbid obesity (6), COPD (10), seizure disorder (2), leucopenia (2), Kaposi’s sarcoma (2), hyperlipidemia (3), and diabetes (4). Several patients experienced multiple underlying conditions.



Male vs. Female Deaths

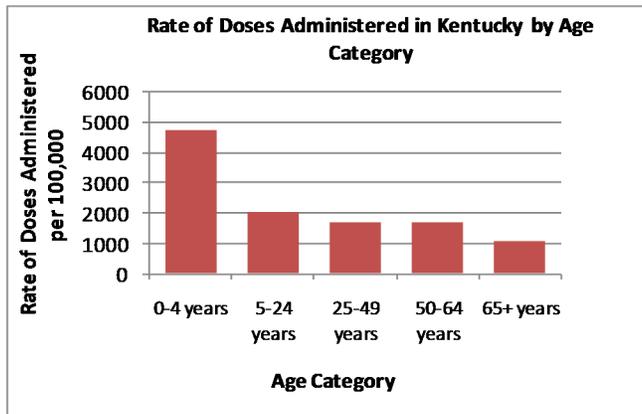


Of the H1N1-related deaths, 24 of the patients were women and 17 men.

Using Mortality Data to Target Vaccine Coverage

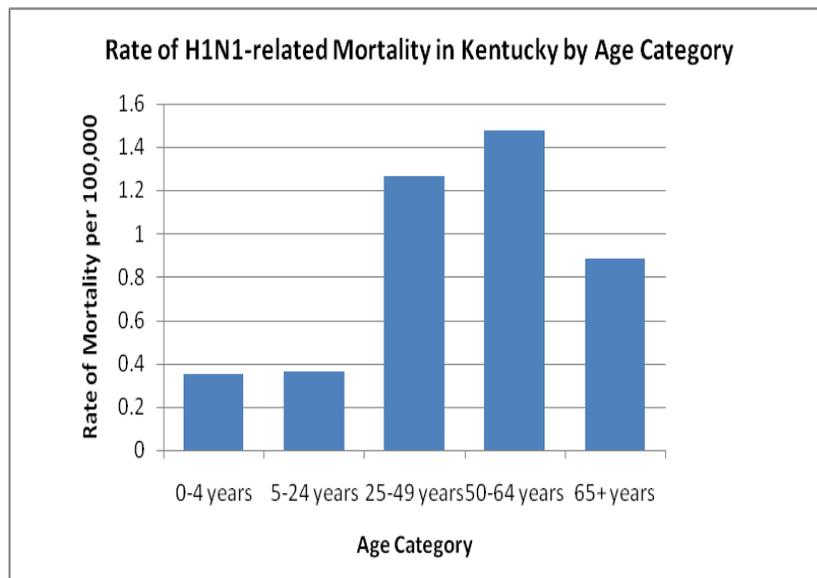
In the fall 2009, the KY Department for Public Health asked local health departments and providers to submit data for vaccine doses given before December 1st, as a way to measure the progress of the how many Kentuckians had been vaccinated. One purpose of collecting this information was to compare doses administered by age category to gauge which age groups were being most effectively targeted during the vaccine campaign. Because the age groups are not uniform in population size or the number of years covered, vaccination coverage *rates* were calculated in each of the age groups. In order to get a snapshot of coverage rates, the number of doses reported to have been administered was divided by the population size of each age group in Kentucky and then multiplied by 100,000 to get the rate per 100,000 people for each age group. The figure below presents the rates of doses administered in Kentucky by age category.

It is important to note that the rates presented are minimum rates, well below the true rates. This is because doses that were administered after December 1st are not included. Thus, the chart does not present the rate of doses administered in its entirety, but it illustrates the comparative *distribution* of vaccination coverage between age groups.



The doses administered data was collected by asking LHD's and providers to fill in a table on the 'Order and Activity Worksheet' with the number of doses given to each age group. Because the data is submitted voluntarily, complete accuracy of reporting cannot be assured.

It is equally important to examine the rate of H1N1-related mortality by age group and compare this to our vaccination coverage rates to answer the question, "Were those most at risk in the population targeted effectively?" To obtain mortality rates, the number of deaths in each age group was divided by the respective population figures for those age groups and multiplied by 100,000 to get the rate per 100,000. As can be seen, the 0-4 year age group had the lowest mortality rate (.35/100,000) while the 50-64 year age group had the highest mortality rate (1.3/100,000). This measurement provided an indication of what age groups should be aggressively targeted for vaccination during the H1N1 pandemic, in order to prevent or reduce mortality.



Kentucky State Lab Surveillance

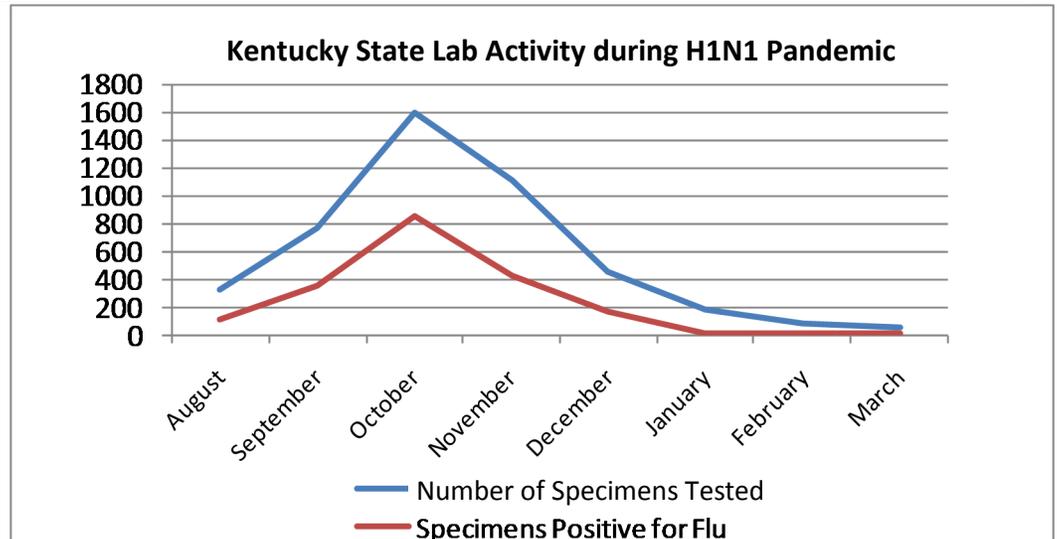
The Kentucky State Lab received the first sample to be tested for novel H1N1 influenza on April 27, 2009. In the following nine months the lab tested 5,977 specimens for influenza. This was more than the combined previous six seasons (2003-2009, prior to April 27th) of influenza testing which consisted of 5,730 samples. From a public health perspective, the viral subtype testing performed by the lab played a major role in H1N1 surveillance efforts. Monitoring the increasing number of specimen submissions and realizing that the H1N1 subtype accounted for nearly all influenza cases as the pandemic unfolded allowed KDPH to make informed decisions on educating providers and the public about combating H1N1 influenza.

Nearly all (99.7%) of the specimens that tested positive for influenza were positive for novel H1N1 influenza A. The table below displays the total number of specimens tested and the number of specimens that tested positive for influenza by month; and the pie graph illustrates this pattern as well. The graph shows how the overwhelming majority of specimens that tested positive for influenza were novel H1N1 influenza A viral subtype.

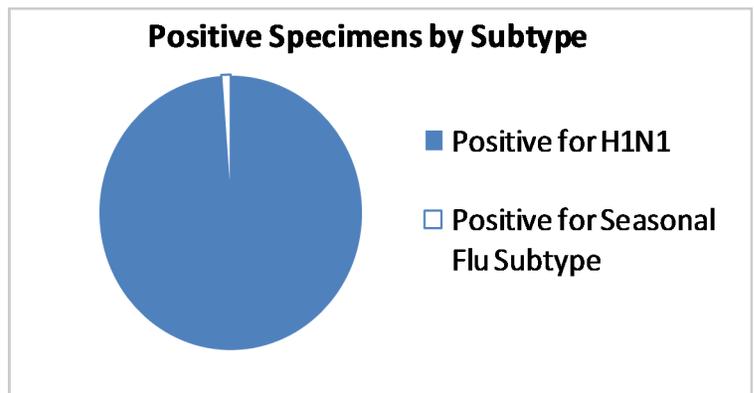
As a result of the lab’s extensive specimen testing and surveillance, the Kentucky Department for Public Health was alerted to influenza activity trends in the state and was able to act accordingly. The results of the specimen testing also served as a strong indicator of the status of the H1N1 pandemic for public health practitioners and clinical providers.

Surveillance of Virus Subtypes

| | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | March |
|-----------------------------------|------------|------------|-------------|-------------|------------|------------|-----------|-----------|
| Specimens Tested | 327 | 769 | 1594 | 1106 | 453 | 189 | 88 | 98 |
| Specimens positive for Flu | 116 | 358 | 857 | 430 | 172 | 22 | 16 | 27 |



The advent of H1N1 influenza led to an atypical influenza season. Only four cases of seasonal influenza were confirmed during the regular season. It is not clear why this happened, but it could have been a combination of increased seasonal influenza vaccine uptake and unknown effects of the H1N1 virus on seasonal influenza.

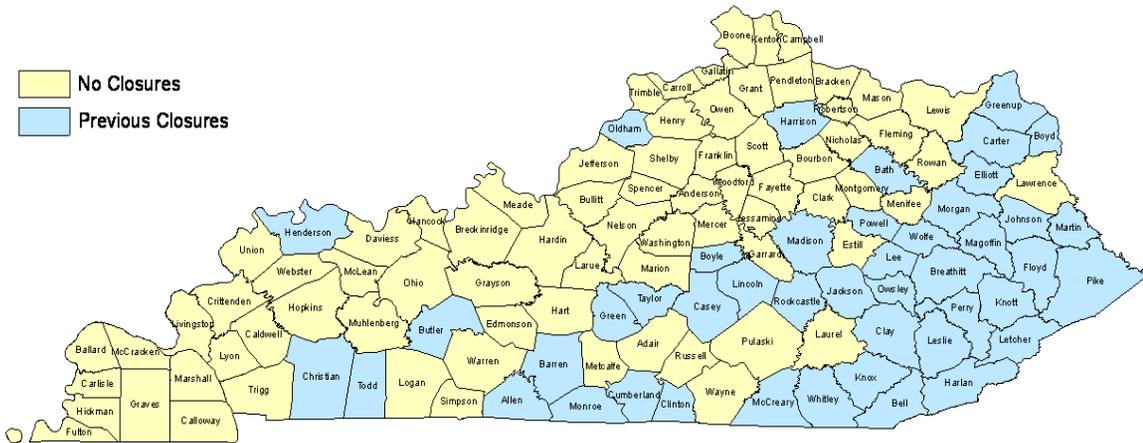


School Surveillance

Kentucky has a total of 174 school districts and 1,249 public schools. Between August 1, 2009 and November 30, 2009, 947 schools from 54 districts closed one or more days due to influenza like illness. The first reported school closure was on August 18th. The map below shows counties which experienced school closures versus those that did not throughout the duration of the H1N1 pandemic. The three highest peak days of school closures during the time period were:

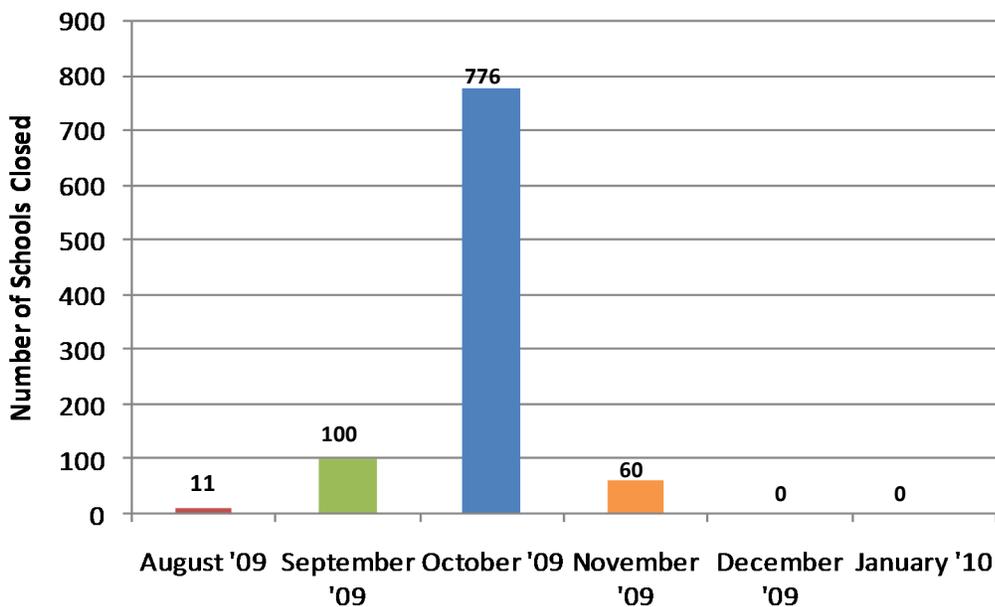
- October 1: 59 schools
- October 23: 76 schools
- October 30: 88 schools

Public School Closures Due to Influenza-Like Illness by County August 1, 2009 – April 30, 2010



Number of Public Schools Closed Due to ILI by Month of School Closure

Since August 31, 2009. (Please note the number of closures describes the number of schools closed rather than the number of school districts closed).



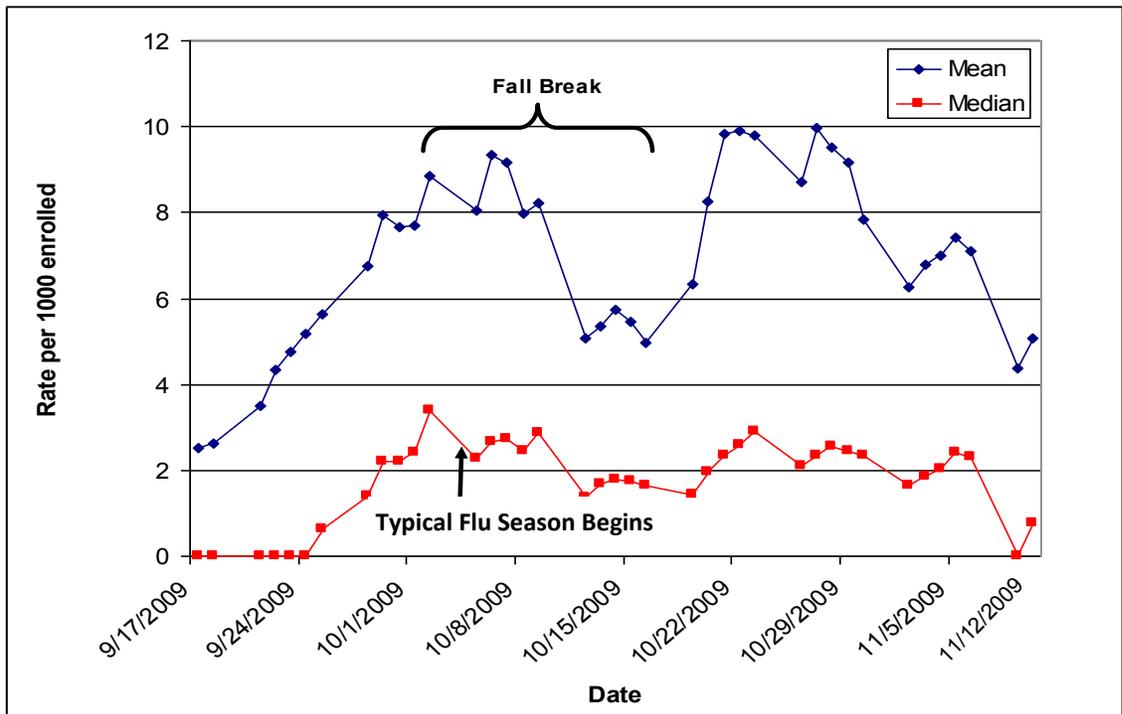
School Absenteeism Attributed to ILI

For previous issues of KY Fluview, find them at Kentucky Health Alerts: <http://healthalerts.ky.gov/Pages/KentuckyFluView.aspx>

By implementing a syndromic surveillance system that focused on school-aged children and youth, where infectious diseases often emerge first and spread rapidly, Kentucky Department for Public Health (KDPH) and the Kentucky Department of Education (KDE) worked together to detect and monitor influenza outbreaks. The information was helpful for KDPH to implement timely public health prevention measures, which may have reduced the magnitude of influenza outbreaks in the community. Since beginning the surveillance of school absences attributed to influenza-like illness, KDPH has collected approximately 120,000 absentee records from over 175 daily reports on over 1,180 schools across the state. This automated reporting system was established with the help of KDE and their technology services vendor, "Infinite Campus," using a meager amount of pandemic influenza response funds and approximately one month of planning and development. The system captures absences attributed to ILI by the local schools administrative staff based on parental information, physician notes, and other sources of information.

This ILI surveillance project strengthened an already productive partnership with Kentucky public schools. The project was intended to ease information exchange between KDPH and KDE regarding influenza and other public health matters, support early detection of ILI by making it simple for schools to report absenteeism data and ILI, and focus public health resources in response to early detection of increased ILI and student absenteeism rates.

Rate of Absences Attributed to ILI in KY Public Schools

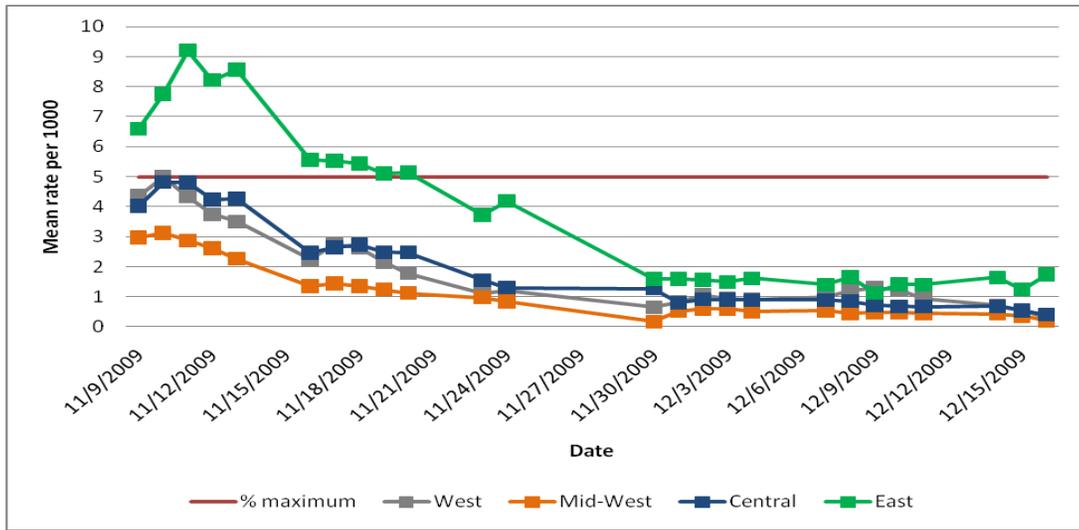


The graph above displays the mean and median rate of school absences attributed to ILI in Kentucky public schools. The average, or mean, can be distorted by counties where one school or a few schools have extreme values (for example, one school may have 85 absences per 1,000 students for ILI where most schools have only 15). Another way to present the data that avoids distortion due to extremely high rates for a few schools, is to use the median rate for each county. The median rate represents the midpoint of the various school absenteeism rates in each county (half the schools have a higher rate, and half of the schools have a lower rate); it is not influenced by extreme values in a few schools. The line graph above shows the rate of absenteeism by displaying the mean and median trends. The rates presented are per 1,000 enrolled students. The line graph depicts the rate of absenteeism during the peak of the influenza activity of the fall 2009 wave (from mid-September to early November).

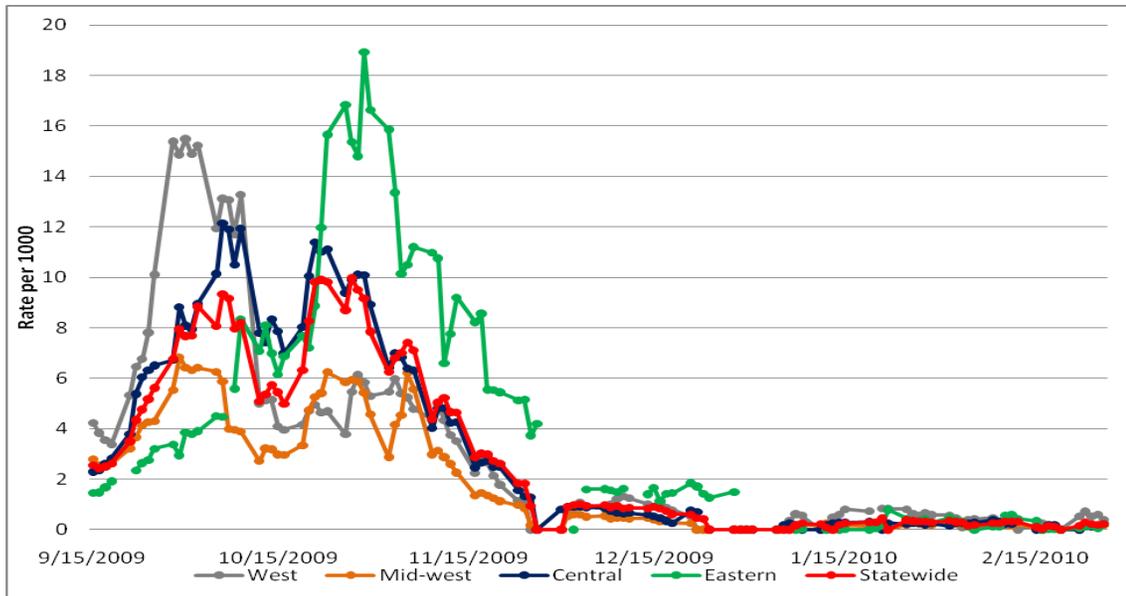
School Absenteeism Attributed to ILI by Region

The chart below shows trends in the mean rate of absences attributed to ILI per 1,000 children enrolled in Kentucky public schools, stratified by region, from 11/09/2009 – 12/16/2009. This snapshot of school absenteeism begins in early November, right after the largest peak of school closures. The red line represents half the maximum rate seen statewide. The east shows the highest rates of absenteeism throughout the end of the fall wave of the H1N1 pandemic. As the fall semester came to a close, absenteeism rates returned to normal.

Regional Mean Rate of Absences Attributed to ILI per 1,000 Enrolled Students



Regional mean rate of absences attributed to ILI per 1,000 enrolled September 2009—February 2010

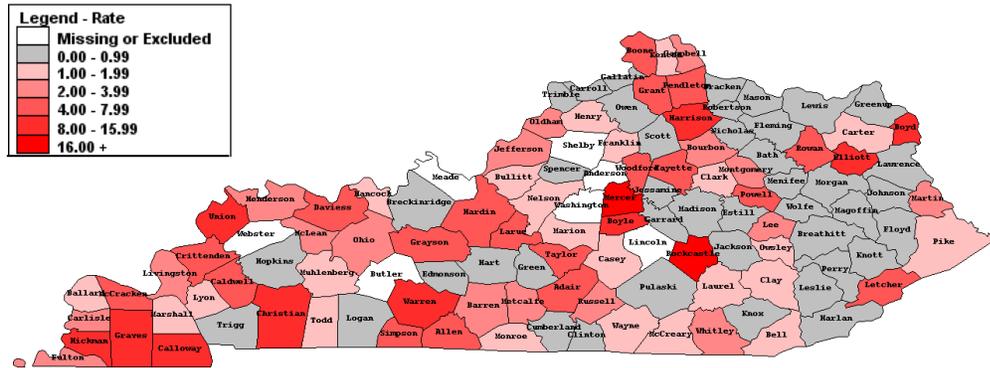


The figure above shows the time series of ILI reporting from Kentucky public schools from the initial report of the system through February of 2010. Regionally, ILI-related absence followed a West to East pattern; the highest peak occurred in the Eastern Kentucky region in late October and early November of 2009. Statewide, the mean rate of ILI reached a high of 10 per 1000 enrolled students. Regional reports began a steady decline by mid-November 2009, and continue to stay below 1 report per 1000 enrolled school children into 2010.

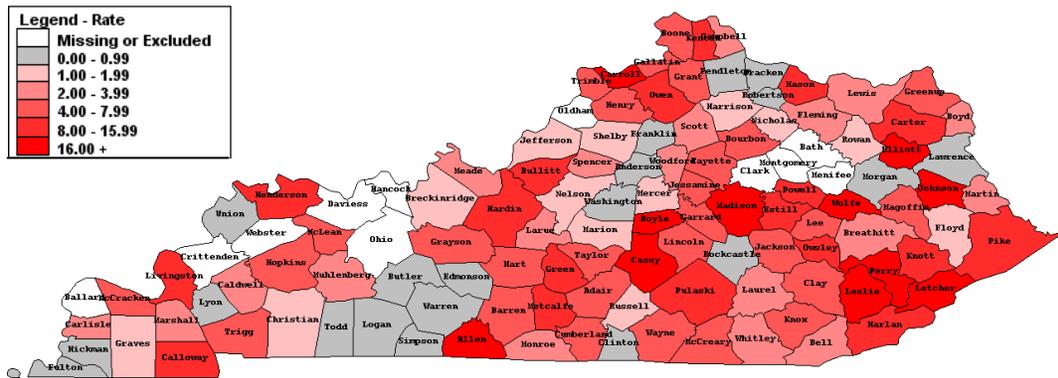
School Absences Map of Kentucky During Fall Wave of H1N1

This set of maps shows the average rate of absences attributed to ILI per 1,000 students from all public schools in Kentucky by county. A progression of ILI during the fall wave of H1N1 can be seen beginning in western Kentucky and moving across the state to the east. The red color indicates high rates of absenteeism. The map from late October 2009 shows the greatest frequency of red counties; the high rate of absenteeism corresponded with the time Kentucky experienced the highest level of influenza activity.

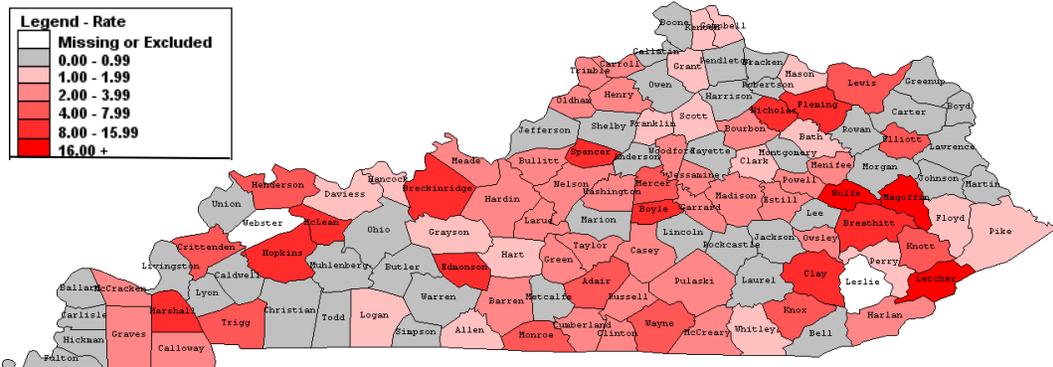
Average Rate of Absences Attributed to ILI in Public Schools in September 2009



Average Rate of Absences Attributed to ILI in Public Schools in October 2009



Average Rate of Absences Attributed to ILI in Public Schools in November 2009



Pregnant Women Surveillance

Pregnancy and H1N1

A pregnant woman who becomes infected with any strain of influenza has a greater chance for serious health problems. Compared with other groups, pregnant women with novel H1N1 influenza are more likely to be admitted to hospitals and are also more likely to experience serious illness and die. Research has found that pregnant women who have had a flu shot get sick less often with the flu than do pregnant women who did not get a flu shot. Babies born to mothers who had a flu shot in pregnancy also get sick with flu less often than do babies whose mothers did not get a flu shot. The Centers for Disease Control and Prevention (CDC) recognized that the H1N1 virus was affecting pediatric patients at a higher rate than the typical age group affected by influenza (age 65 and older). For these reasons, the CDC was interested in investigating further if H1N1 adversely affects pregnant women and birth outcomes.

Vaccines for Pregnant and Post-Partum Women

Public health officials from CDC and the Kentucky Department for Public Health advised pregnant women to get flu shots either with or without thimerosal (a mercury preservative in vaccine). Although there is no evidence that thimerosal is harmful to a pregnant woman or a fetus, because some women are concerned about thimerosal during pregnancy, vaccine companies made preservative-free seasonal flu vaccine and H1N1 flu vaccine in single-dose syringes for pregnant women and small children. A nasal spray influenza vaccine was also available and considered safe for women after they have delivered their baby, even if they are nursing. The seasonal flu shot has been given to millions of pregnant women over many years. Flu shots have not been shown to cause harm to pregnant women or their babies.

Influenza Surveillance in Pregnant Women Hospitalized due to the Influenza Virus

The H1N1 Pregnant Women Surveillance Process

In October 2009, the Centers for Disease Control and Prevention (CDC) began a nationwide surveillance effort to collect data on pregnant women with severe illness due to laboratory confirmed influenza virus. The goal of the surveillance project was to “improve timeliness, completeness, accuracy, and level of detail in nationwide reporting of deaths and ICU admissions due to influenza in pregnant women and women with symptom onset up to 6 weeks postpartum.” The surveillance effort was prompted by the rising number of deaths in pregnant women due to the influenza virus. All states were asked to participate in the surveillance project by reporting all ICU admissions and deaths among pregnant and postpartum women with a confirmed influenza virus infection indicated by **at least one** of the following laboratory tests:

- A positive rapid influenza test
- rRt-PCR (real-time reverse transcription-polymerase chain reaction) positive for influenza
- DFA and IFA (Direct and indirect immunofluorescence assays)
- Viral culture

In addition to the requested surveillance efforts initiated by CDC, the Kentucky Department for Public Health took the surveillance effort one step further by collecting data on all pregnant women (and up to six weeks postpartum) who were hospitalized for at least 24 hours due to a confirmed influenza infection. Regional Epidemiologists across the state of Kentucky collected data on hospitalizations in pregnant women due to influenza infection since August 21, 2009 and will continue collecting this data until the end of the spring flu season.

In Kentucky, there were 21 completed case reports for confirmed hospitalizations of pregnant women due to influenza infection. However, no cases of pregnant women with H1N1 were reported as ICU admissions and none died. Participation of providers in this surveillance was voluntary and these cases were not mandated to be reported to the state health department under Kentucky law. Therefore, although we used both active and passive surveillance methods we cannot be sure that all pregnant women hospitalized in Kentucky due to influenza infection were reported.



INFORM AND EDUCATE

Decision makers: the mother of small children deciding when and the best type of vaccine for her children, the school superintendant deciding whether to close schools, or the Governor deciding how to guide the Commonwealth's resources. All needed information to guide their decisions. KDPH provided information to decision makers through many means. Our primary communication methods are described in the following pages, including:

- **Media briefings**
- **Media releases**
- **Kentucky Fluview**
- **A Pandemic Flu summit**
- **Public Flu hotline**

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Kentucky Department for Public Health's Use of the Media During H1N1 Pandemic Response

Active surveillance, data collecting, and research efforts are all important elements of public health practices, but none of these efforts are worthwhile unless public health practitioners communicate effectively. The Kentucky Department for Public Health used a variety of communication media to disseminate influenza education to both the public and providers. The messages geared towards the public mostly addressed vaccine safety and availability issues, while communication to health care providers included information on vaccine administration, current surveillance reports, and management of vaccine allocation, ordering and shipping. The KDPH Office of Communications provided timely information through various avenues including weekly briefings, press releases, network alerts, audio releases, special events, public service announcements, electronic media, and printed materials. As the concerns and needs of the community changed throughout the pandemic, communication supplied by the KDPH changed as well. Topics addressed ranged from vaccine recall information to guidelines for treating H1N1.

Weekly Briefings

The Commissioner of Public Health, Dr. William Hacker, and State Epidemiologist, Dr. Kraig Humbaugh, held ten media telebriefings from October to January. The purpose of these telebriefings was to provide media and local health departments with information regarding the status of H1N1 novel influenza activity in Kentucky so they could communicate these updates to the public. Among other forms of communication utilized were press releases, the Kentucky Outreach and Information Network (KOIN), audio news releases, special events, public service announcements, electronic media, and a variety of printed materials. Communications sent out during the H1N1 response are listed below and on the following page.

Press Releases

- Kentucky Department for Public Health Continues to Be on Alert for Cases of Swine Flu, Currently Testing Specimens Submitted by Health Care Providers (April 29, 2009)
- Governor Beshear Announces First Swine Flu Cases Reported by Public Health (April 30, 2009)
- Public Health Reports Probable H1N1 Swine Flu Case in Montgomery County Resident, Specimen Has Been Sent to CDC for Further Testing (May 2, 2009)
- Public Health Reports Probable H1N1 Swine Flu Case in Fayette County Resident, Specimen Has Been Sent to CDC for Further Testing (May 3, 2009)
- Public Health Reports Probable H1N1 Swine Flu Case in Daviess County Resident, Specimen Has Been Sent to CDC for Further Testing (May 4, 2009)
- Public Health Reports Probable H1N1 Swine Flu Case in Hardin County Resident, Specimen Has Been Sent to CDC for Further Testing (May 4, 2009)
- Public Health Receives Confirmation of Daviess County H1N1 Swine Flu Case (May 5, 2009)
- Public Health Reports Three More Probable H1N1 Swine Flu Cases in Louisville , Kenton County (May 8, 2009)
- State Public Health Laboratory Now Approved for H1N1 Confirmation; Seven More Cases Confirmed, Reported CDC (May 11, 2009)
- H1N1 Update: Two More Confirmed Cases Reported to CDC (May 14, 2009)
- H1N1 Update: Two More Confirmed Cases Reported to CDC (May 19, 2009)
- H1N1 Update: New Confirmed Cases Reported to CDC , Cases Include Cluster Involving Madison County Community Living Residents (May 20, 2009)
- Governor Beshear Announces Pandemic Influenza Summit, Frankfort Event on September 3rd Will bring Together Key Stakeholders on H1N1 Response (August 5, 2009)
- Public Health Urges Good Hygiene Habits to Avoid H1N1 Flu, Flu Cases Expected to Increase During Back to School, Regular Flu Season (August 6, 2009)
- Registration Available Online for Governor's Pandemic Influenza Summit on Sept. 3rd (August 14, 2009)
- Flu Activity Level Increases to Regional Activity, Public Health Urges Awareness of Good Hygiene Habits (August 18, 2009)
- Media Advisory Background Telebriefing on Novel H1N1 Flu for Media, Background Telebriefing on Novel H1N1 Flu for Media Statewide (August 24, 2009)

Press Releases (*Continued*)

- Department For Public Health Reports First H1N1-Related Death in Kentucky (September 3, 2009)
- Flu Level Raised to Widespread in Kentucky (September 18, 2009)
- Health Care Providers Encouraged to Participate in 2009 H1N1 Vaccination Campaign Local Health Departments Can Assist with Sign-ups (September 25, 2009)
- Kentucky Department for Public Health Launches New Public, Toll-Free H1N1 Hotline (October 5, 2009)
- DPH Reports Two Additional 2009 H1N1-Related Deaths (October 5, 2009)
- Kentucky Department for Public Health Provides Update on H1N1 Vaccine, Urges Patience (October 23, 2009)
- Survey to Assess H1N1 Vaccine Availability to Kentuckians (December 11, 2009)
- Kentuckians Urges to Get H1N1 Flu Vaccination During National Influenza Vaccination Week (January 12, 2010)
- H1N1 Influenza (Swine Flu) Public Hotline Closing (January 22, 2010)

Kentucky Outreach and Information Network Alerts (KOIN)

- H1N1 (Swine Flu) Update; August 5, 2009
- Public Health Urges Awareness, Good Hygiene Habits to Avoid H1N1 (Swine Flu) (August 7, 2009)
- Flu Level Raised to Widespread in Kentucky (September 18, 2009)
- Kentucky Public Health Launches New Public Hotline for H1N1 (Swine) Flu (October 5, 2009)
- Limited Availability of H1N1 Swine Flu Vaccine (October 13, 2009)
- Fraudulent Emails Referencing CDC-sponsored State Vaccination Program (December 4, 2009)
- Update on H1N1 (Swine Flu) Information to Pass on to You and the Organization that you Serve (December 11, 2009)
- Non-safety Related Voluntary Recall of Certain Lots of H1N1 Pediatric (0.25 mL for 6-35 months old) Vaccine in Pre-Filled Syringes (December 15, 2009)

Audio News Releases

The Kentucky Department for Public Health held three series of three audio news releases each, for a total of nine audio news releases focusing on H1N1 symptoms, prevention, availability and safety of vaccine.

Special Events

- Governor's Pandemic Flu Summit
- **KET** H1N1 Special
- Establishment of public statewide H1N1 hotline
- H1N1 Vaccine Availability Survey

Public Service Announcements (Release of two television commercials)

- "Good Advice regarding H1N1 from Nurse in Hospital"
- "Water Cooler" spot where a group of coworkers are gathered to discuss myths about the H1N1 vaccine

Use of Electronic Media

- <http://healthalerts.ky.gov>
- Twitter KyHealthAlerts

Printed Material

The Kentucky Department for Public Health Office of Communications also produced numerous fact sheets developed for general H1N1 information, vaccine safety, and for target groups such as citizens with low literacy levels. Information cards were also produced in English and Spanish detailing target groups and basic influenza info. Various print advertisements in Kentucky Living magazine targeted messages to rural residents. Bus transit advertisement included two series of bus advertisements in English and Spanish with basic influenza information targeted at the vaccine priority groups. The Office of Communications also promoted H1N1 flu information by printing messages on state employee paychecks.

KDPH Use of Media During H1N1 Response (Continued)

Printed Material– Kentucky Fluview

One of the successful communication strategies used throughout the fall wave of the novel influenza A H1N1 epidemic has been the publication the “Kentucky Fluview.” The weekly production of the newsletter began as an initiative planned in the early stages of the H1N1 response as a tool to communicate surveillance and other pertinent information to state leadership, state and local health department personnel, the medical community, media, and the public. *Fluview* developed into a collaboration of articles contributed from Kentucky epidemiologists covering topics like H1N1 mortality rates, school surveillance including school absenteeism data, vaccine allocation information from the CDC, and special public health interest stories.

The main purpose of the newsletter was to disseminate timely H1N1 surveillance information to our partners and to inform the state leadership, including Governor Steve Beshear, on the progression of the epidemic and what the public should know about protecting themselves and their families against the virus. The *Fluview* also functions as an educational tool for local health departments, professional health associations like Kentucky Medical Association (KMA) and the Kentucky Hospital Association (KHA) to better assist them in planning and decision-making in responding to the pandemic.

The Kentucky *Fluview* was highlighted as a ‘Promising Practice’ according to Center for Infectious Disease Research & Policy (CIDRAP) and the Pew Center on the States (PCS), which launched an initiative in 2006 to collect and review practices that can be adapted or adopted by public health stakeholders. You can view this and additional entries for Kentucky at: <http://www.cidrappractices.org/practices/list.do?state-id=21>.

For previous issues of KY Fluview, find them at Kentucky Health Alerts: <http://healthalerts.ky.gov/Pages/KentuckyFlu-View.aspx>

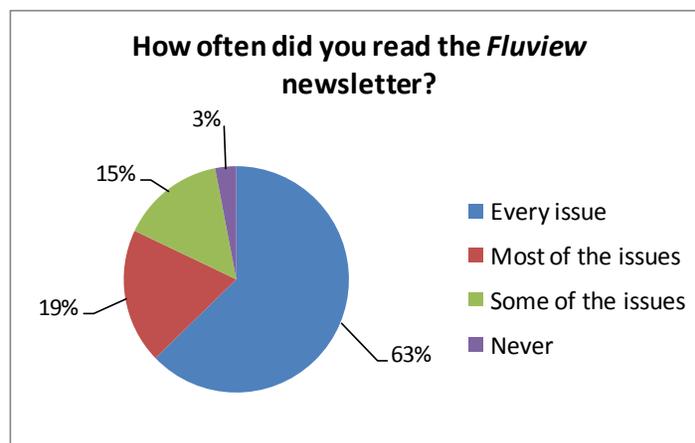
Fluview Satisfaction

The *Kentucky Fluview* staff has enjoyed producing the *Fluview* newsletter, which began as a weekly publication to provide surveillance updates to state leadership, clinicians, local health departments, and other public health practitioners. The *Fluview* staff asked readers in a survey for their feedback on how useful they found the newsletter.

Most of the *Fluview* readers who responded to the survey worked in local health departments (62.5%), followed by hospitals or clinics (17.2%), and academic institutions (6.3%). Most of our readers agreed that the Kentucky Department for Public Health should continue using the method of a newsletter to disseminate information for other public health responses, because readers found it to be an effective tool. An overwhelming majority of *Fluview* survey respondents found the data presented in the newsletter helpful (90.6%).

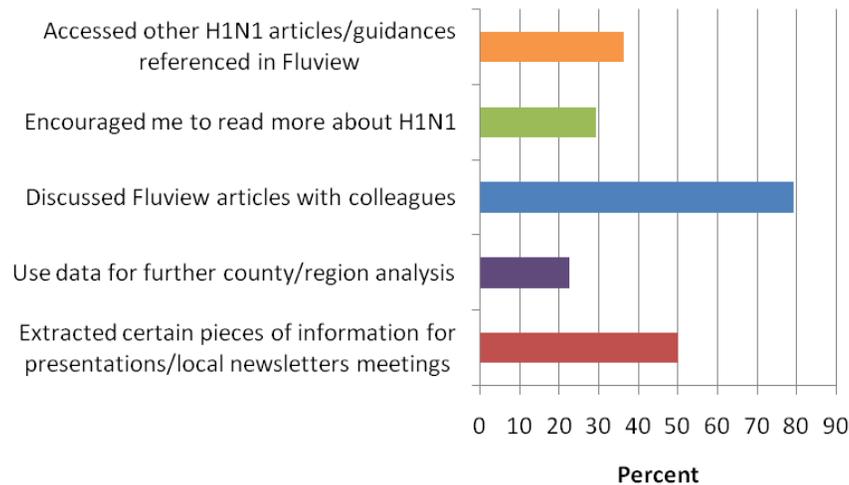
The survey results are valuable feedback to the *Fluview* staff as well as KDPH. One of the most critical objectives of public health efforts is to effectively disseminate information to the public through various channels (LHDs, media, partnerships). Knowing which methods work best in reaching the most people allows for KDPH to make better decisions about which communication avenues are most appreciated by our partners and the public.

For more results of the *Fluview* Satisfaction Survey, please see the graphs on the following page.

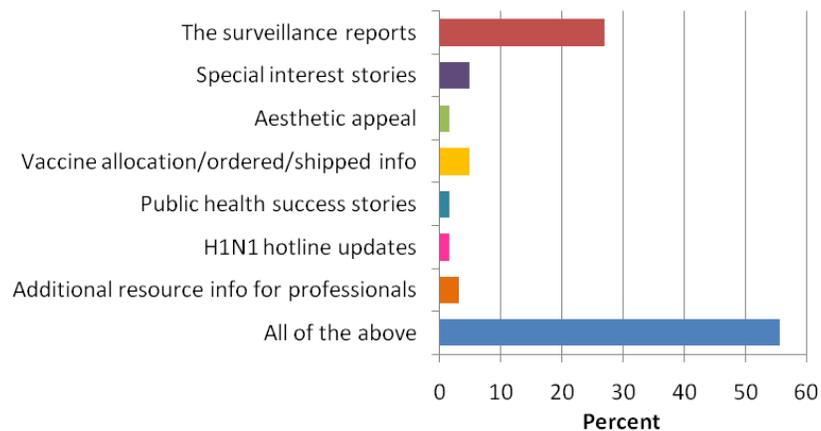


Fluview Satisfaction (continued)

Did you use data presented in the *Fluview* in a particular way?



What about the *Fluview* did you find most useful?

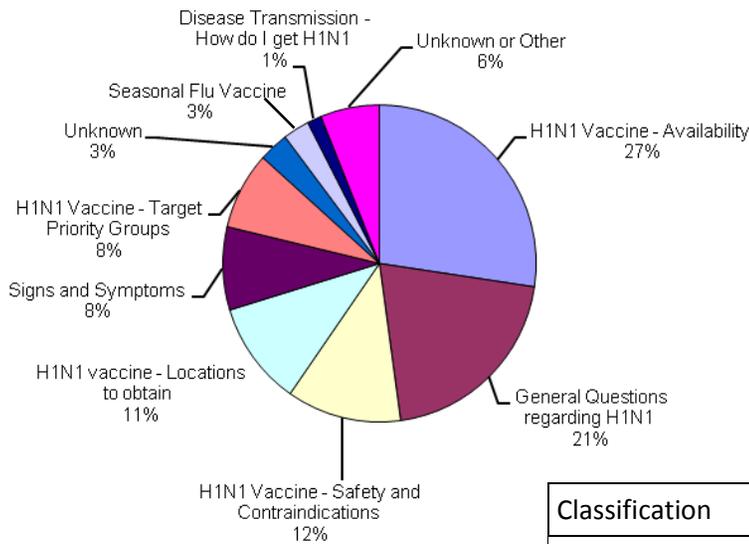
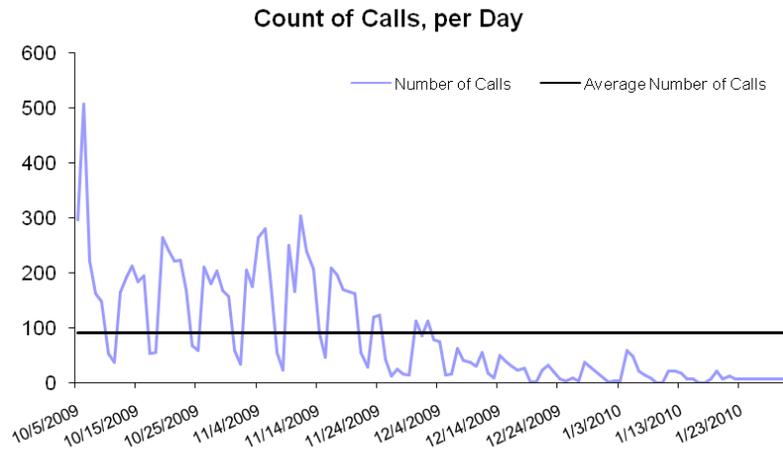


Pan Flu Summit

During summer 2009, public concerns of the H1N1 pandemic were very high. The virus was spreading around the world and vaccine was not yet available. In order to provide information about H1N1 and help alleviate these concerns, KDPH, in partnership with the University of Louisville, held the Governor's Pandemic Influenza Summit on September 3, 2009, at the Frankfort Convention Center. KDPH originally expected 200-300 people to attend the summit but registration far exceeded expectations. The summit hosted more than 1,200 people who learned about Kentucky's capacity to respond to the expected surge in H1N1 cases and gained helpful information to prepare their organization for the continuation of the pandemic. Target audiences included business, public and private organizations, K-12 education, secondary education, law enforcement and public safety agencies, health care workers and faith-based organizations. Public health experts discussed the current H1N1 situation and the expectations for the evolution of the pandemic. Representatives from schools, businesses and health care organizations discussed current pandemic flu plans and preparedness activities. Breakout sessions encouraged detailed information sharing on these topics and more. KDPH received positive feedback from participants indicating that the summit helped to successfully respond to the pandemic. The relationships that were built throughout the pandemic contributed to the success of Kentucky's response to H1N1 and have given Kentucky a firm foundation of partners for future responses and collaboration.

H1N1 Public Telephone Hotline: Summary Report

On October 5, 2009 KDPH established a telephone hotline to answer questions from the public. The flu hotline was staffed by nurses and administered by Kosair Children’s Hospital, a part of Norton Healthcare. The flu hotline closed on January 24, 2010 having logged 10,008 phone calls. The chart to the right displays the trend of calls per day, showing heavy use during the height of the epidemic. The average number of calls per day was close to 100, but peaks in Oct./Nov. reached 250-300 calls per day.



Frequency of Questions Asked

The most frequent questions asked were related to the availability of H1N1 vaccine (27%), general questions about the H1N1 vaccine (21%), and vaccine safety and contraindications (12%).

Caller’s Classification

The chart to the right describes subgroups that callers were inquiring about. Nearly half of the calls were not about specific groups, but of those able to be classified, the most frequent calls were about people with chronic conditions (13.66%), followed by school aged students (13.06%), and parents or guardians calling on behalf of their infant or toddler (9.34%). Of all 10,008 hotline calls, only about 1% were business and workplace concerns, the disabled population, or travelers.

| Classification | Count | Percent |
|---------------------------------|-------|---------|
| Unidentified | 4,628 | 46.24% |
| People w/ Chronic Conditions | 1,367 | 13.66% |
| K-12 grade students | 1,307 | 13.06% |
| Infants or toddlers; pre-school | 965 | 9.64% |
| Older Adults | 935 | 9.34% |
| Pregnant Women | 286 | 2.86% |
| Healthcare workers & clinicians | 191 | 1.91% |
| Childcare | 93 | 0.93% |
| University students | 80 | 0.80% |
| Other | 54 | 0.54% |
| Business and workplaces | 51 | 0.51% |
| Disabled population | 26 | 0.26% |
| Travelers | 25 | 0.25% |



MOBILIZING COMMUNITY PARTNERSHIPS

In responding to disease outbreaks and disasters, public health relies on an interdependent web of partners in promoting health and stopping the spread of disease. The H1N1 Pandemic called Kentucky’s public health network to a higher level of collaboration than ever before. This section describes the efforts of the many partners who worked with public health during the H1N1 response.

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- University of Kentucky Hospital Lab-Testing Verification.....22

Partnerships: H1N1 Pandemic Response Efforts

One driving factor that allowed KDPH to respond effectively to the H1N1 pandemic, was the variety, number and strength of the partnerships that existed and were formed during the outbreak response. These partnerships made it possible to reach a wide spectrum of the public health and medical community as well as the public. Additionally, activities such as keeping clinicians abreast of current testing, treatment, guidelines, and coordinating mass vaccination clinics and gathering data from the school system regarding school closures and absenteeism and disseminating that information to stakeholders was made possible through partnerships. These and other accomplishments are outlined below in a list of KDPH's major partnerships that supported the response to the H1N1 pandemic.

Primary Stakeholders/Partners in the H1N1 Pandemic Response

STATE AGENCIES AND BOARDS

- Kentucky State Governor's Office
- Kentucky Personnel Cabinet
- Kentucky Board of Emergency Medical Services
- Kentucky National Guard
- Kentucky State Police
- Kentucky Transportation Cabinet
- Kentucky Department of Agriculture
- Kentucky Department of Education
- Kentucky Office of the Inspector General
- Occupational Safety and Health Program, Kentucky Cabinet Labor Cabinet
- Kentucky Cabinet for Health and Family Services Office of Communications
- Kentucky Division of Emergency Management
- Kentucky Community Crisis Response Board
- Kentucky Department of Aging and Independent Living

ACADEMIC ORGANIZATIONS

- University of Kentucky College of Public Health
- University of Louisville School of Public Health and Information Sciences

NON-GOVERNMENTAL ORGANIZATIONS

- Kentucky Association of Family Physicians
- Kentucky Chapter of American Academy of Pediatrics
- Counsel on Post-Secondary Education
- Kentucky Primary Care Association
- Kentucky Coalition of Nurse Practitioners and Nurse Midwives
- Kentucky High School Athletic Association
- Kentucky Pharmacists Association
- Kentucky Medical Association
- Kentucky Nursing Association
- Kentucky Regional Poison Center
- Kentucky Hospital Association and Kentucky Hospitals

LOCAL GOVERNMENT AGENCIES

- Medical Examiner's Office and County Coroners
- All Local Health Departments

HEALTHCARE PROVIDERS

- Veteran's Affairs Hospitals (Lexington and Louisville)
- University of Kentucky Healthcare
- Norton Healthcare
- Health care providers in the sentinel surveillance network
- Health care providers enrolled in the Kentucky Vaccine Program

Of particular note, none of KDPH's hard work would have been effective had it not been for the engagement and commitment of our 56 local health departments. The local health departments participated in numerous weekly teleconference meetings, conducted mass vaccination clinics, addressed the personal needs of their communities, along with countless other unseen accomplishments. Our collective hats are off to all of our LHD partners and all organizations and individuals who participated in the H1N1 response. Following are some highlighted specific examples of partnerships that grew out of this response.

Increasing the Supply of Surveillance Data Through a Partnership with the Kentucky Department of Education

Just as weather reports provide us with early information from which forecasts are made which then guide our decision-making (i.e. take an umbrella or protect plants from frost), public health seeks early information about the occurrence, severity, and spread of disease to make sound decisions for response and control of an outbreak such as pandemic influenza. However, obtaining information can be difficult and expensive. Realizing that influenza is most likely to affect children the greatest, KDPH developed a partnership with the Kentucky Department of Education to piggyback on their school attendance system to provide information on the occurrence and spread, both geographically and temporally, of influenza-like illness. Such information is valuable to:

- understand the ILI activity level occurring in schools
- understand overall activity level and geographic spread
- guide preparation for additional waves of H1N1, and monitor changing virility of the virus
- plan for interventions such as mass vaccination clinics and public information campaigns
- plan for treatment services and medical service capacity

Tracking the progress of an epidemic can be difficult. KDPH did not have time nor money to establish new surveillance systems across all of Kentucky's 120 counties. Kentucky public schools use an information system for tracking attendance and other information from a vendor called "Infinite Campus." This system provided useful data from 1,180 schools across the state without an additional administrative burden for local schools. Approximately 120,000 absentee records from over 175 daily reports were collected during the pandemic. KDE provided KDPH with a direct daily information feed on student absences related to ILI as both a percentage of overall absences as well as overall student enrollment. The system captures absences attributed to ILI by administrative staff based on parent's information, physician notes, and other sources of information. The system also provided information on daily school closings due to ILI.

Remarkably, this system was put into place with about one month's time for planning and development. See "School Surveillance" starting on page 8 for results of this system.

Sentinel KY ILINet Providers

Several Kentucky healthcare providers volunteer their time to contribute to the state's influenza surveillance program and do so with little recognition. Their volunteer work is an important contribution to the Commonwealth's influenza monitoring efforts. To recognize this contribution, KDPH is pleased to give a special thanks to the following contributing organizations.

| | |
|---|--|
| All Children Pediatrics | KY Mountain Health Alliance/ Little Flower Clinic |
| All Star Pediatrics | Lebanon Pediatrics |
| Asbury College Student Health Services | Lexington Clinic |
| Children's Health, PLLC | Lexington Clinic Richmond |
| Comprehensive Care | Lexington-Fayette County Health Dept. Primary Care |
| East Louisville Pediatrics, PSC | Louisville Area Pediatrics |
| Eastern KY University Student Health Services | Morehead State University Counseling & Health Services |
| Family Medicine Assoc. of Western Kentucky | Nicholasville Pediatrics |
| Family Practice Associates of Lexington, PSC | Riverview Clinic |
| Green County Primary Care | Saint Claire Family Medicine - Frenchburg |
| Health Plus PSC | UK North Fork Valley Community Health Center |
| Hometown Family Care | Union College Campus Health Center |
| Jessamine Medical Center | University of Kentucky Student Health Service |
| Kaplan Barron Pediatrics | University of Louisville Campus Health Services |
| Kentuckiana Pulmonary Association | Western Kentucky University Health Services |

Partnerships

Kentucky Pharmacy Association and Distribution of Antiviral Medications

During the H1N1 pandemic response, KDPH moved its partnership with the Kentucky Pharmacy Association (KPhA) to a new level. The KPhA already provided staff as a resource to KDPH for use during identified emergencies. However, in response to the H1N1 outbreak, KPhA helped with the storage, distribution and management of Kentucky's antiviral supply. KPhA also provided oversight for identifying pharmacies throughout Kentucky counties where a supply of antivirals could be sent and used. The grand totals of antivirals dispensed since 10/23/2009 through the uninsured or underinsured program included 3,965 Tamiflu prescriptions and 227 prescriptions for pediatric antiviral suspensions. There were 227 pharmacies that participated.

KPhA staff reported daily and weekly to KDPH on pharmacies with stockpiles of antiviral medication, antiviral use, as well as any activity that pharmacists were seeing first hand. KPhA also acted as a resource for local health departments when requested. This provided total state coverage of all counties in Kentucky and completely alleviated the burden of providing antivirals through the LHDs.

Norton Health Care and the Public H1N1 Hotline

The Kentucky Department for Public Health (DPH) launched a toll-free influenza hotline in early October, which fielded approximately 10,000 calls about H1N1 and seasonal flu from that time through January.

The hotline was staffed by nurses and administered by Kosair Children's Hospital, a part of Norton Healthcare, through a contract with DPH funded by a federal grant award related to H1N1 activities. Kosair Children's Hospital also operates the state's Regional Poison Center hotline, which served as an invaluable partner during the pandemic response. KDPH staff crafted and continually modified call scripts, which were used by hotline staffers to keep them up to date on current H1N1 information and consistent in their responses.

"I would like to extend our thanks to our partners at Kosair Children's Hospital and the Regional Poison Center hotline for the excellent information they have provided Kentuckians about the current influenza pandemic," said DPH Commissioner William Hacker, M.D.

At the peak of public interest, the hotline fielded hundreds of calls per day. The hotline's work at assisting public health by providing direct information to people statewide helped ensure that local and state health officials and their partners had the time needed to conduct pandemic response efforts, rather than requiring separate dedicated phone or hotline staff for each community. It also enabled a consistent message in response to questions.

"As an advocate for children and families across the state, we are committed to ensuring that the public has access to the most accurate, up-to-date information about health issues, including H1N1 influenza," said Thomas D. Kmetz, president of Kosair Children's Hospital and pediatric services at Norton Healthcare, when the hotline launched.

See "H1N1 Public Telephone Hotline: Summary report on page 18 for more results.

University of Kentucky Hospital Lab – Testing Verification

The KDPH lab has cooperated with the UK medical lab for several years (since the 1990s) by providing Influenza confirmation and strain typing for influenza positives identified by the UK Medical Lab. At the onset of the 2009 Novel H1N1 outbreak the KDPH Laboratory was the only lab in Kentucky performing testing for the novel flu. This solo coverage by the KDPH Lab continued for most of the 2009 season. The UK medical lab continued to identify Influenza positives and then send the specimens to the KDPH Lab for typing.

At the request of the CDC and the Association of Public Health Labs (APHL), the KDPH Lab assisted in the validation of novel influenza testing within Kentucky at commercial or private labs. In the summer of 2009 the UK Medical Lab began validation testing within their laboratory for the 2009 Novel Influenza strain.

During the validation process, the KDPH Lab and the UK Medical Lab exchanged positive and negative samples to corroborate UK's testing. Late fall of 2009, UK completed their validation testing and took over their own H1N1 testing, relieving the KDPH State Lab of a portion of its testing burden.



SUPPORT FOR INDIVIDUALS AND COMMUNITIES: HEALTH EFFORTS THROUGH POLICIES AND PLANS

The H1N1 response required the development of several policies, guidance statements, and plans. This section describes KDPH’s efforts to support the health care system to address H1N1, including:

- **Guidance and professional notices**
- **The vaccine allocation procedure**
- **Guidance on the use of N95 facemasks**
- **Higher education’s response plans**

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Guidance and Professional Notices

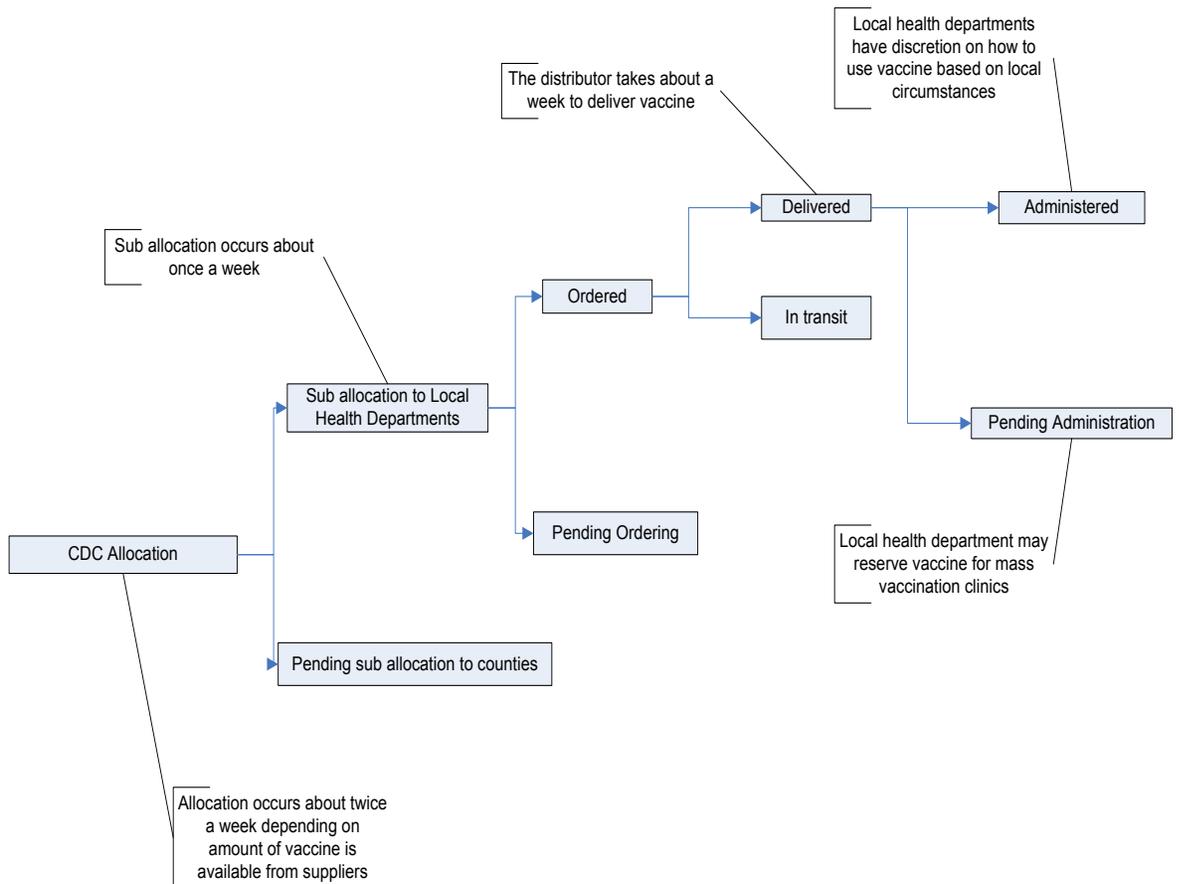
The Kentucky Department for Public Health prepared clinical guidance on many H1N1 topics. Documents were made available for providers and the public. Most of these documents are posted at the Health Alerts Website: <http://healthalerts.ky.gov/Pages/HealthProfessionalsInfo.aspx>. See below for an extensive list of the most significant guidance and professional notices prepared.

| Title | Distributed | Date |
|---|---|----------|
| KDPH Novel H1N1 Vaccinator Recruitment Letter | Clinician groups; LHD Directors; LHD Nurse Leaders; CHFS DPH Regional Epidemiologists; CHFS DPH PHP Trainers; CHS Infection Control Health Depts; CHS Infection Control Hospitals | 8/28/09 |
| Letter on Hand Sanitizer Use | LHD Directors; Public and Environmental Health; Nursing; Epi Staff; School superintendents | 9/1/09 |
| What People 50 and Older Should Know about Swine Flu and Seasonal Flu | LHDs, AAAIL's, AARP, KALFA, and other aging network providers | 9/28/09 |
| PPE Guidance for Non-Healthcare Workers | LHD Nurse Leaders; CHFS DPH Regional Epidemiologists; CHFS DPH PHP Trainers; LHD Directors | 10/7/09 |
| KDPH Novel H1N1 Influenza Key Points for Clinicians | LHD, KMA, KHA, FQHC, AAP | 10/13/09 |
| KDPH Facts about Facemasks | LHDs, LHD Nurse Leads, H1N1 Workgroup | 10/20/09 |
| Coroner Guidance | LHD Directors; Regional Epis; CHFS DPH PHP Coordinators; CHFS DPH PHP Trainers | 10/28/09 |
| FDA Emergency use authorization for the use of <u>Peramivir</u> | Clinician groups; CHS Infection Control Hospitals | 10/29/09 |
| Sample Paramedic MOU and Protocols for Mass Vaccination Clinics | LHD Directors; LHD Nurse Leaders; CHFS DPH PHP Coordinators; CHFS DPH Regional Epidemiologists; Kentucky Community and Technical College Schools | 11/10/09 |
| H1N1 LAIV Clinician Guidance Letter from Dr. Hacker | LHD Directors; LHD Nurse Leaders; CHFS DPH Regional Epidemiologists; CHS Infection Control Health Depts; CHS Infection Control Hospitals; Clinician groups | 11/13/09 |
| CDC Vaccine Adverse Event Reporting Guidance | Infection-Control-Hospitals; LHD Directors; LHD Nurse Leaders; CHFS DPH Regional Epidemiologists; CHS Infection Control Health Department | 11/18/09 |
| 2009 H1N1 influenza vaccine administration grid | LHD Directors; LHD Nurse Leaders; CHFS DPH Regional Epidemiologists; CHFS DPH PHP Trainers | 11/24/09 |
| LHD Guidance H1N1 Vaccine Expansion | LHD Directors; LHD Nurse Leaders | 12/9/09 |

Other valuable guidance and education pieces sent out included: Antiviral guidance for obstetric care providers, KDPH recommended modifications of existing CDC recommendations for Infection Control in Healthcare Settings and N95 Respirator Use, KDPH Vaccine and Antiviral Distribution Plan, 'Stop the Spread of FluAd, Caregiver Fact Sheet, Low Literacy Swine Flu Fact Sheet (English/Spanish), and Basic 2009 H1N1 Fact Sheet (English/Spanish).

Vaccine Allocation Procedure

As adequate amounts of vaccine were manufactured and sent to warehouses, CDC gave each state allocations of vaccine. This allocation was based on the state’s proportion of the national population. KDPH then sub-allocated vaccine to local health departments and districts based on that LHD proportion of the Kentucky’s population. Because a small allocation required as much effort to distribute as a large allocation, on some occasions KPHD would not sub-allocate until two or more allocations were made by CDC. In addition, shipping rules prohibited shipments of less than 100 doses to one location. Using a spreadsheet based on population, amount of vaccine previously ordered, and keeping the 100 dose minimum rule, KDHP allocated vaccine to LHDs. LHDs then ordered vaccine. KDPH used its existing vaccine ordering software, called VACMAN, to place orders with CDC. CDC’s vendor, McKesson, then fulfilled the vaccine order, along with syringe kits and sharps containers.



Development of Guidance on the Use of N95 Masks in Healthcare Organizations

A national shortage of N95 masks during the H1N1 pandemic created concerns in Kentucky.

During the KDPH Friday meetings with H1N1 partners, one vexing problem sparked many lively discussions: the use of N95 masks by health care workers, in terms of appropriate level of protection, proper guidance for practicality, and feasibility, given limited supplies of N95 masks.

Medical providers, health care unions, and worker safety advocates were concerned about several deaths of nurses who reportedly died of complications related to H1N1.

CDC guidance stated that a surgical mask is not sufficient to protect workers from H1N1 patients. The CDC recommended the use of respiratory protection such as fit-tested disposable N95 respirators for health care personnel who are in close contact with patients with suspected or confirmed H1N1 influenza. However, the use of masks was not universally approved. Some argued that the N95 masks were not clinically relevant—they did not provide additional protection to health care providers over surgical masks.

The Department of Labor and the Occupational Safety and Health Administration (OSHA) took the position that employers should do everything possible to protect their employees. Failure to provide masks made health care providers liable to employee complaints. A complaint would result in an inspection and potential fines. However, during the pandemic, there was a shortage of N95 masks, and following the stringent guidelines initially handed down by CDC, DOC and OSHA left no 'wobble room' for the shortages that were guaranteed to occur, if the policies were followed.

The Society for Healthcare Epidemiology in America recommended the use of surgical masks for respiratory protection during routine patient care activities, not the universal use of N95 respirators. The Society said the "Inappropriate and widespread use of N95 respirators for all novel H1N1 patient care activities does not provide increased protection against the virus and may have an adverse impact on patient and healthcare worker safety." The universal use of N95 respirators would deplete the supply of respirators, which are essential components of infection prevention and control strategies for airborne pathogens such as tuberculosis.

OSHA was aware of the shortage of masks. Eventually, it was agreed that if masks were not commercially available, a health care provider could be considered to be in compliance if the employer made every effort to acquire respirators. Health care employers needed to be able to show documentation of orders that had been placed or statements from a manufacturer that the respirators were on back order. Such documentation provided evidence that the employer made a good-faith effort to procure masks. At the time of the shortage, CDC also provided some flexibility to hospitals. That meant in some circumstances, health care workers reused masks, continued to wear them while caring for more than one patient, or may have even worn surgical masks as a last resort option. The CDC preference was for extended use (in which the respirator is not removed while the health care worker cares for more than one patient) over reusing the mask.

Our partners noted that N95 masks were only one of several health care worker safety control measures such as source control, engineering, administrative measures, and vaccination of health care workers.

Institutional Preparedness: Universities' H1N1 Response

One of the trends most concerning about the H1N1 virus was the age of those most affected. According to the Centers for Disease Control and Prevention, 60% of seasonal influenza hospitalizations and 90% of flu-related deaths occur in people 65 years and older. The pattern with novel H1N1, however, is that approximately 90% of estimated hospitalizations and 87% of estimated deaths from April 2009 to January 2010 occurred in people younger than 65 years old. Due to this concerning trend, public health practitioners and clinicians were eager to increase vaccine availability and influenza education to high-risk groups—including young adults. College and university campuses were an ideal place to assess how the H1N1 outbreak affected young adults. To better understand how colleges and universities prepared and responded to the H1N1 influenza, Wayne State University and the University of Kentucky's Community Mitigation Task Force surveyed 180 universities on their strategies to lessen the adverse effects of the H1N1 outbreak.

A nationally representative sample of colleges and universities was drawn from the American Association of Colleges and Universities, which contains over 1,200 members. The study was conducted through telephone interviews with a representative person at the university who was "the person with most knowledge of campus H1N1 preparedness plan." There were 180 universities in the sample, with a response rate of 82.6% (Confidence Interval \pm 6%).

The following chart indicates the survey results when the universities were questioned about their crisis planning, planning leadership, social distancing, influenza shots, funding, and disseminating education.

Results from the 'Institutional Strategies for Preparedness' Survey Assessing College and University Responses to the H1N1 Pandemic

| | |
|--|---|
| Does your school have a crisis plan? | 97% answered 'yes' |
| Does the plan include pandemic provisions? | 55% said their school had a separate pandemic plan; 42% said the pandemic provision was part of the general crisis plan; 3% answered 'no' |
| Who plans? | Dean of Students— 8%, Campus police/public safety —13%, Vice President of Operations —3% Other —71% |
| What is in the 'pandemic plan'? | Of the respondents' answers, the most common were: crisis management team, student alert system, and key contacts. |
| What are the main social distancing provisions? | Cancellation of large gatherings, suspending classes, teaching class online, closure, close resident halls and dorms, and other (including moving students, sick rooms, flu floor, hand sanitizers, web conferencing, changing drop policy) |
| Does your college offer seasonal flu shots? | 91% answered yes, and 26% said the seasonal vaccine was paid for |
| How was information disseminated? | Most common respondent answers included: internet sites, mass email to faculty and students, posters/flyers, and description by staff |
| What messages were included in the education disseminated? | Cover you cough, wash your hands, stay home when sick, use hand sanitizer, eat healthy, rest, seek care if sick |
| What are the most commonly used mitigation strategies? | Encouraging faculty and students to stay home when sick, encourage hand hygiene, flu education, encouraging covering cough and sneeze, making hand sanitizers widely available, cleaning surfaces, isolate students with symptoms |

One of the initial observations from the survey was that universities and colleges seemed to take the pandemic seriously and were aggressive in creating plans to help manage H1N1 outbreaks. A wide variety of communication methods were used and the messages were largely consistent with that of the CDC. Social distancing was a primary mitigation strategy, a method especially useful in an environment with a dense resident population and international students such as on college campuses.



SEEKING INNOVATIVE SOLUTIONS THROUGH SURVEYING AND RESEARCH

Effective public health practices are revealed through the evaluation of the accessibility and quality of personal and population-based health services. By researching new insights and innovative solutions to health problems, public health practices are better equipped to serve communities. This section describes two ways that KDPH surveyed and researched in order to improve future practices.

- **Kentucky Vaccine Availability Survey Results**
- **Impact of Seasonal Influenza-Related School Closures on Families- Southeastern Kentucky**

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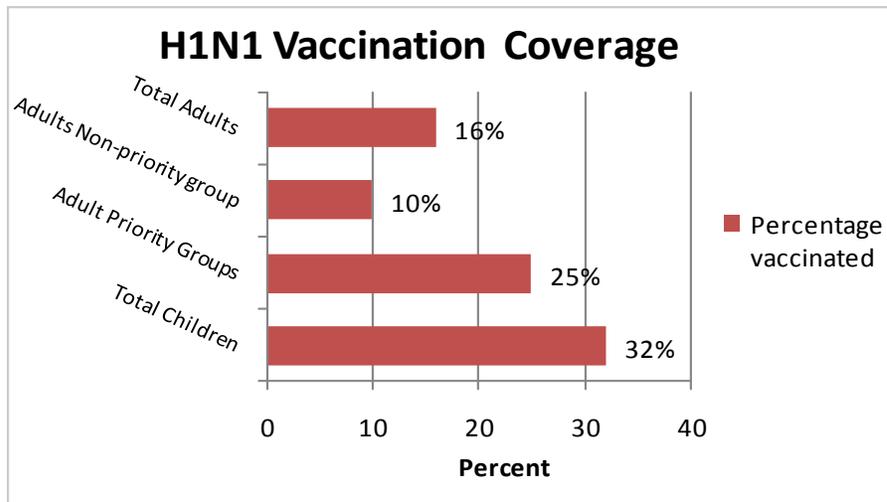
Kentucky H1N1 Vaccine Availability Survey Results

To examine overall vaccination coverage, vaccine uptake within priority groups, and public demand for H1N1 vaccine, the Kentucky Department for Public Health conducted a random phone survey of adult Kentucky residents.

Percent Vaccinated

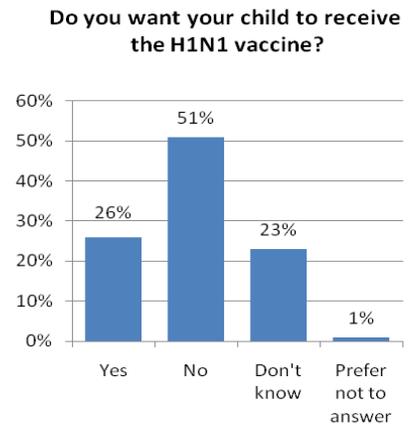
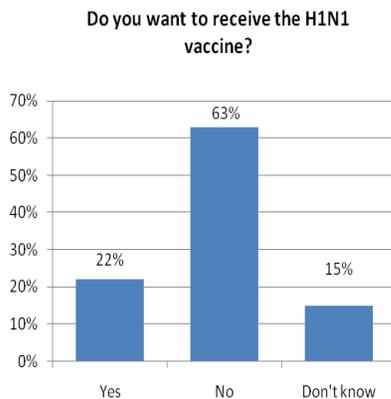
As of December 18, a total of 801 adults had been surveyed in Kentucky homes. Of the respondents, 16% had received the H1N1 vaccine. Among the H1N1 adult priority groups, 25% had received the H1N1 vaccine as seen in the first chart below. The priority groups included pregnant women and women 6 weeks post partum; people who live with or care for children younger than 6 months; health care and emergency service workers; children and young adults age 6 months to 24 years; and adults age 25 to 64 years with chronic health conditions such as asthma, heart disease, weakened immune system and kidney disorders. Of those respondents with children age 6 months to 17 years in their household, 32% said that their child had been vaccinated for the H1N1 flu.

Methodology
 On behalf of the Kentucky Department for Public Health, the Matrix Group, a public opinion research firm, conducted a telephone survey to determine H1N1 vaccine coverage among adult Kentuckians and the children in their household. The randomly selected adult telephone survey was conducted from December 9 to December 18, 2009, and 801 respondents age 18 and older participated. Among the respondents, 235 answered questions regarding vaccination coverage of a randomly selected child age 6 months to 17 years in their household. The margin of error is $\pm 3.5\%$. Percentages may not total 100% due to rounding.



Want to Receive the H1N1 Vaccine

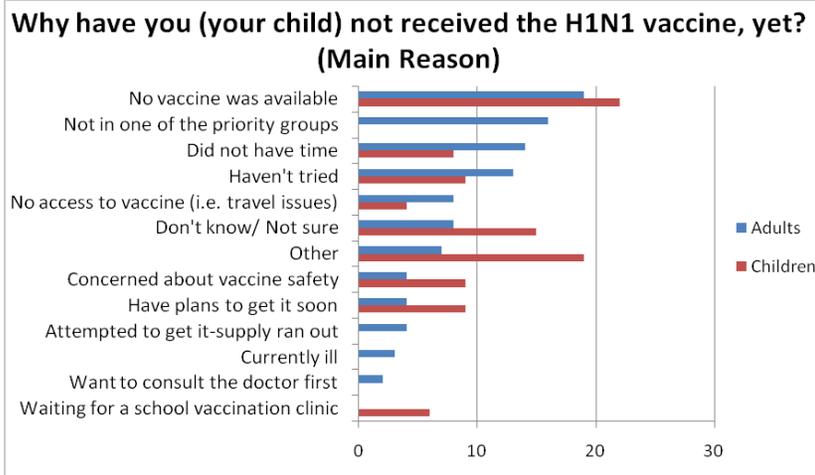
At the time of the survey, the majority of the respondents had not had the opportunity to be vaccinated yet. Of those adults who had not been vaccinated, 22% wanted to be vaccinated in the future as seen on the chart below on the left. Among the adults whose children had not been vaccinated, 26% wanted their child to receive the H1N1 vaccine displayed in the chart on the right. Among those in the adult priority groups who had not been vaccinated, 27% wanted to receive the H1N1 vaccine.



Reasons for Not Receiving the H1N1 Vaccine

Adults

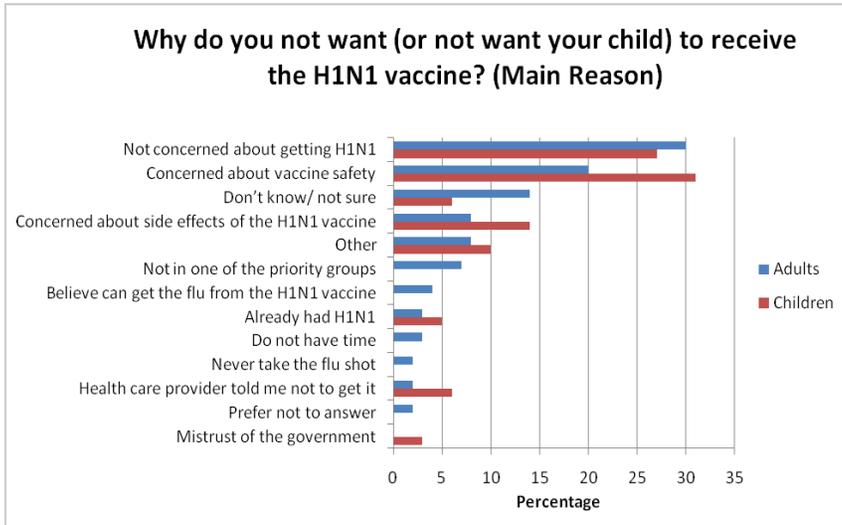
Of those adults who wanted the H1N1 vaccine, but had not yet received the vaccination, the reason most often selected was, "No vaccine was available"(19%), followed by, "Not in one of the priority groups" (16%), "Did not have time" (14%), and "Haven't tried" (13%), as seen on the adjacent graph. Among adults who stated they did *not* want the H1N1 vaccine, "Not concerned about getting H1N1" (30%) was the most frequently stated reason, followed by "Concerned about vaccine safety" (20%), "Concerned about the side effects of the H1N1 vaccine" (7%), and "Not in one of the priority groups"(7%) displayed on the graph below.



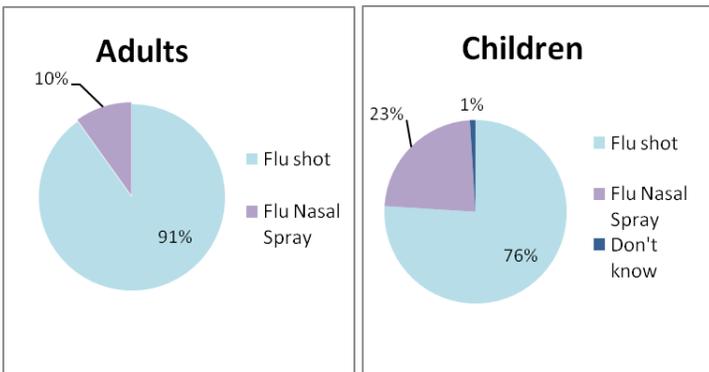
Children

Of those adults who wanted the vaccine for their child, but had not yet gotten their child vaccinated, the reason with the highest percentage was "No vaccine was available" (21%), followed by "Don't know" (15%), "Concerned about vaccine safety" (9%), "Planning to get the vaccine" (9%), and "Haven't tried" (9%) (graph above).

For those adults with children, who did not want their children vaccinated, "Concern about vaccine safety" (31%) was the most frequently stated reason why respondents did not want the H1N1 vaccine for their child followed by, "Not concerned about this child getting H1N1" (27%), "Concerned about side effects of the H1N1 vaccine" (14%), and "Health care provider told me not to get it" (6%), as seen on the graph to the left.



Form of Vaccine Administered

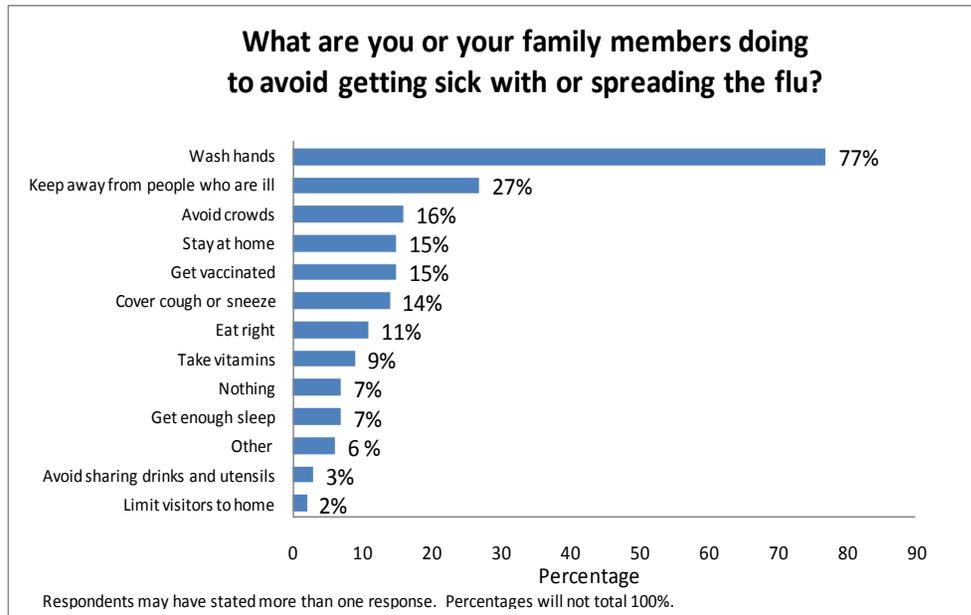


Form of the H1N1 Vaccine

- Among adults, 91% received the vaccine in the form of a shot and 10% received a nasal mist.
- Among children, 76% received the vaccine in the form of a shot and 23% received a nasal mist.

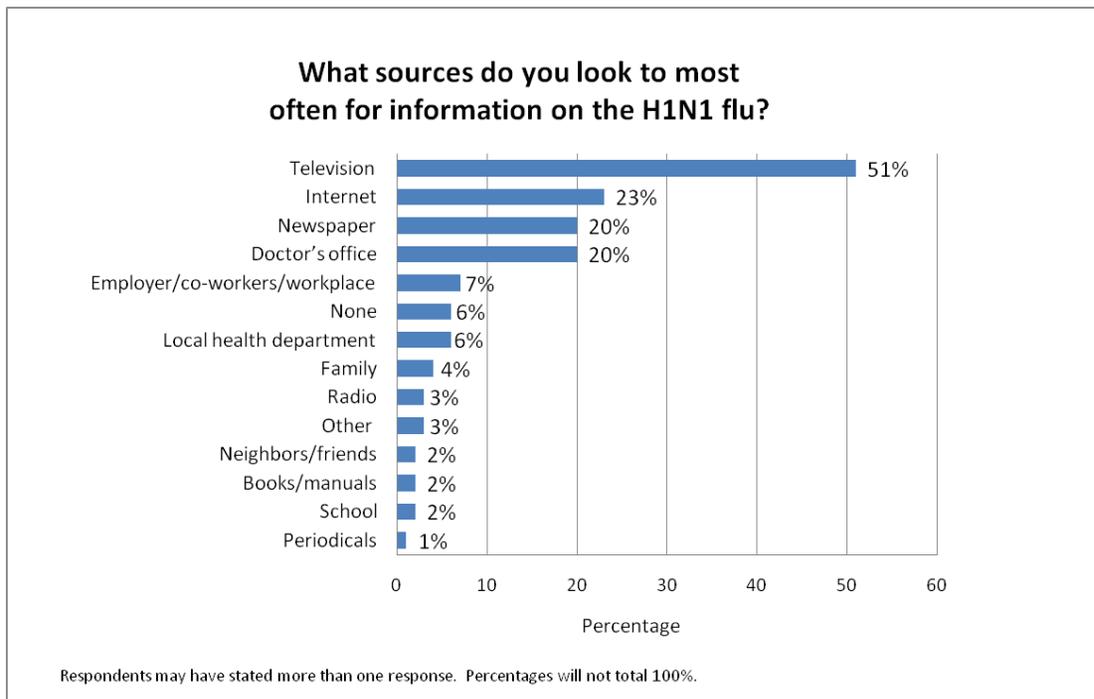
Flu Prevention

When respondents were asked what they were doing to avoid getting sick with or spreading the flu the majority (77%), said that they washed their hands. Other top responses included keeping away from people who are sick (27%) avoiding crowds (16%), getting vaccinated (15%), and staying at home (15%), as seen in the graph below.



Preferred Source of H1N1 Information

The majority of respondents, 51%, reported television as their main source of information for H1N1 flu, followed by the internet (23%), newspapers (20%), and their doctor’s office (20%). Results are displayed in the graph below.



Impact of Seasonal Influenza-Related School Closures on Families- Southeastern Kentucky, February 2008

Highlights from a study sponsored by the Kentucky Department for Public Health and the Centers for Disease Control and Prevention recently published in *Morbidity and Mortality Weekly Report*

During influenza epidemics, little is known about how influenza-related school closures affect families. Many children meet nutritional needs through school food programs, and schools provide child care both during and after school. Moreover, schools rely on student attendance to meet federal and state funding and educational requirements. To assess the impact of school closings on families, the Kentucky Department for Public Health (KDPH) conducted a telephone survey of randomly sampled households whose children attended schools in two adjacent school districts that had been closed because of high absenteeism during an outbreak of seasonal influenza in the community in February 2008.

The study indicated that 97.0% of respondents (parents) agreed with the decision to close schools. In 29.1% of households, an adult had to miss work to provide child care, and in 15.7% of households, at least one adult lost pay because of missed work. Although the schools closed because of high absenteeism affecting school operations and funding, this was not fully communicated to families; 64.4% of respondents believed the closures would “keep people from getting ill,” and 90.8% thought it was “extremely or very important” to disinfect schools while closed to reduce community spread of influenza.

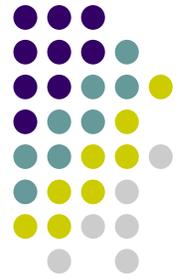
A total of 233 (89.3%) household respondents stated that they knew ways to lower the risk for acquiring influenza, and 200 (76.6%) stated that they did (or told their children to do) something to lower their risk. A total of 171 (65.5%) household respondents reported that they washed their hands to lower their risk for becoming ill or told their children to do so, and 73 (28.0%) household respondents reported telling their children to cover coughs and sneezes or did so themselves as a way to reduce risk for influenza. However, the study also noted that during the school closure for influenza-like illness, 40% of children participated in social gatherings, increasing the likelihood of disease transmission.

In 112 (42.9%) households, at least one child was enrolled in a school meal program (the National School Lunch Program or the School Breakfast Program) and this was significantly different between school districts with School District A households significantly more likely to have children participating in the school meal programs than School District B households ($p < 0.05$). School District B households had significantly higher annual household income and education levels than School District A households ($p < 0.05$).

In making decisions about closing a school, state and local officials must weigh financial obligations, public perception, the need to reduce spread of illness, severity of the illness, and protection of high-risk students and staff. In addition, the impact on children and families and whether high absenteeism compromises the school's ability to function normally must be considered. The authors concluded that school districts and health departments should provide families with specific information about the reason for school closings so that parents understand when the reason is for financial reasons versus disease control. Although schools are rarely closed for disease control reasons, recommendations should be provided to families for reducing the spread of influenza while students are dismissed from school.

To review the complete article, please visit:

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5850a2.htm?s_cid=mm5850a2_e



Local Health Department Response

Most of the work of responding to the H1N1 pandemic, especially that of vaccination and support of the local medical care system occurred locally in the 56 local health department districts in Kentucky. This section highlights:

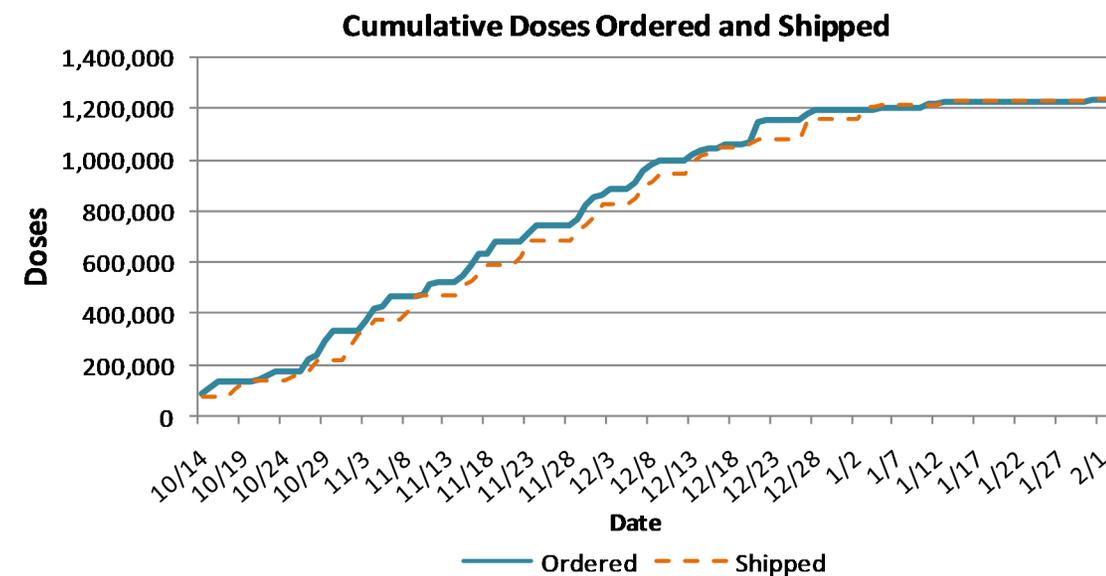
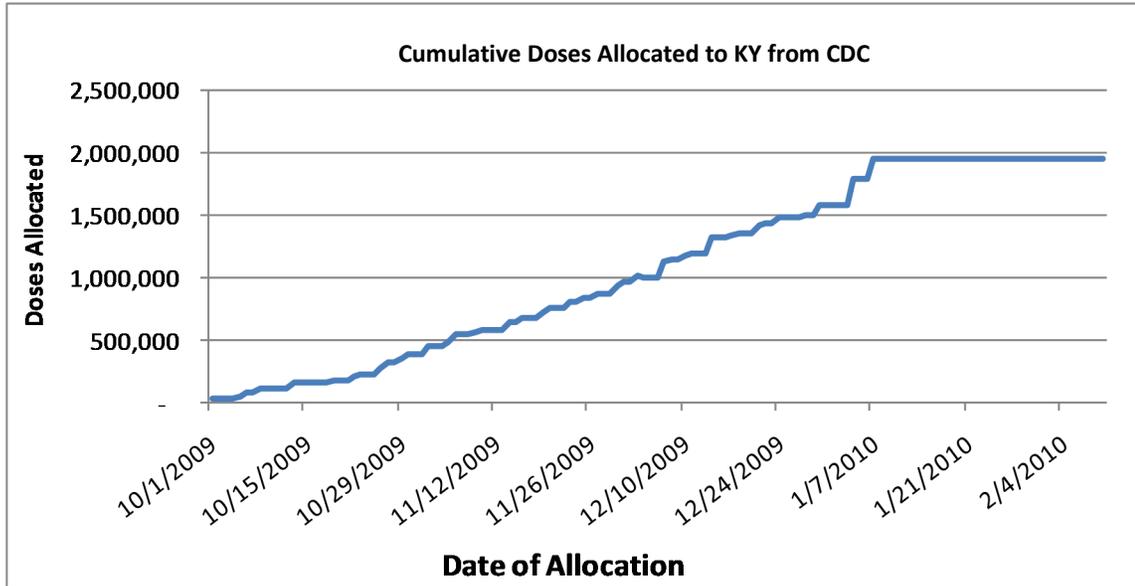
- The vaccine distribution effort
- Vaccine coverage
- Antiviral distribution
- KDPH support of local public health
- ‘Public Health Works’ success stories

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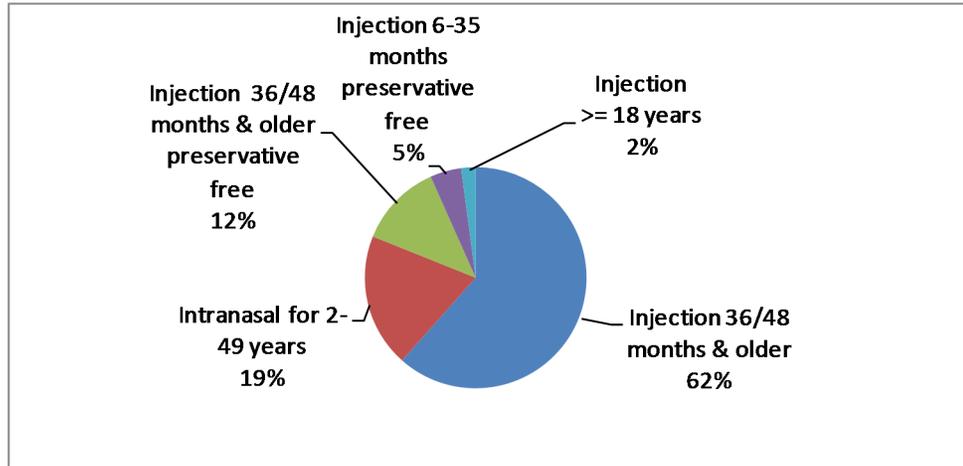
Vaccine Allocation

CDC sent states a weekly 2009 H1N1 allocation report indicating how much of each formulation of 2009 H1N1 influenza vaccine states could order. CDC allocated vaccine based on the state’s population. KDPH then sub-allocated the vaccine allocation to counties and health districts by population. CDC’s vaccine distribution contractor shipped vaccine to hospitals, clinics, doctor’s offices, health departments, and other providers three or four times per week during the height of the epidemic. The chart below shows the cumulative doses of vaccine allocated to Kentucky from the CDC from October 2009 to April 2010.



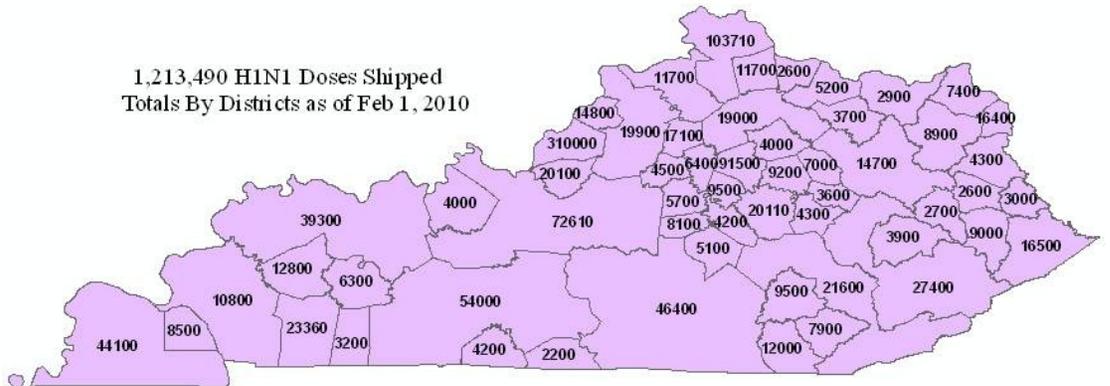
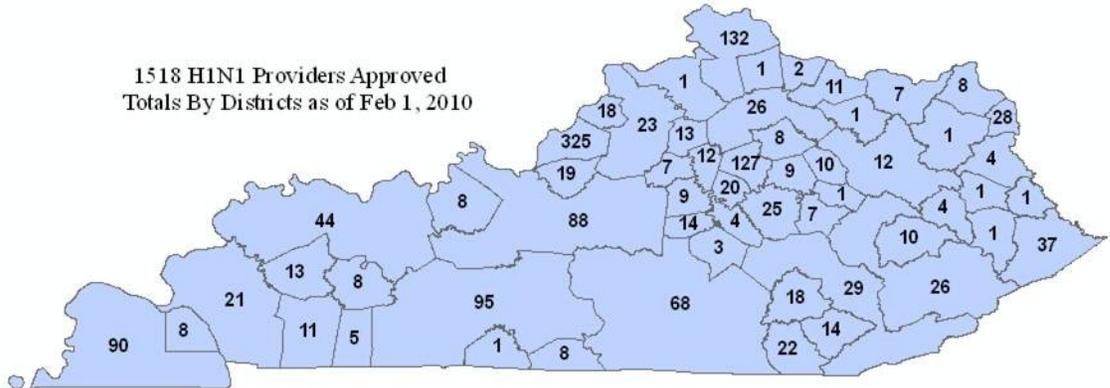
The graph above displays the number of doses ordered and shipped in Kentucky from mid-October 2009 to the beginning of February 2010. The Kentucky Department for Public Health’s Kentucky Vaccine Program would receive allocations from the CDC and then place orders for H1N1 vaccine. Once the orders had been placed, KDPH sub-allocated to the LHDs according to population. The vaccine was shipped from the McKesson warehouse in Tennessee.

Doses Shipped by Type

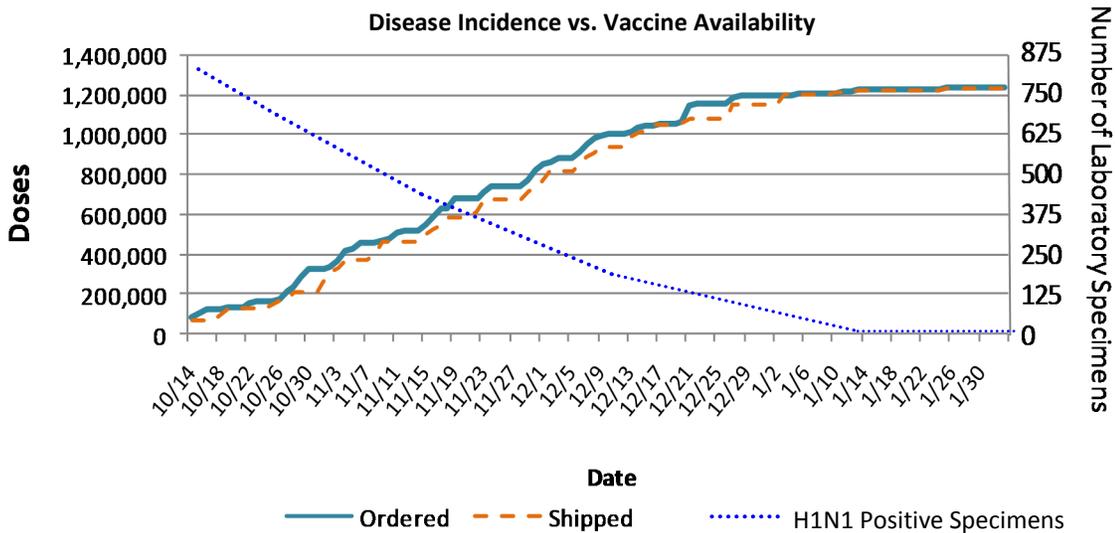


| Type of Vaccine | Shipped |
|--|------------------|
| Injection 36/48 months & older | 768,000 |
| Intranasal for 2-49 years | 243,600 |
| Injection 36/48 months & older preservative free | 153,000 |
| Injection 6-35 months preservative free | 56,700 |
| Injection >= 18 years | 26,300 |
| Total | 1,247,600 |

Vaccine Distribution By Health District



Vaccine Availability Trails Decline of H1N1 Incidence



CDC and vaccine manufacturers made a strong effort to create and produce H1N1 vaccine in sufficient quantities to vaccinate the population and quell the epidemic. They beat the expected 6 month timeline to produce novel H1N1 influenza vaccine that is projected in most pandemic planning scenarios and quickly ramped up to full-scale production by mid-October, less than 6 months after discovery of this novel influenza. However, supplies were limited by production capacity, primarily due to the slower egg-based technology currently in use. As can be seen in the chart above, by the time vaccine distribution in Kentucky reached 400,000 doses, or roughly enough for 10% of the population, the incidence of H1N1 was already on a steep decline (blue dotted line). That, in combination with the clear indications that this strain of influenza was less virulent (possibly even less than seasonal influenza), led to a rapid decline in demand for H1N1 vaccination. Enough vaccine has now been produced to cover about 45% of the U.S. population. Lack of demand has left much of the remaining doses unused.

Vaccine Recalls

Many types of products, including cars, toys, and food products, are sometimes recalled temporarily or withdrawn permanently from the market because they don't work properly or could pose a safety hazard. Similarly, vaccines or vaccine lots can also be withdrawn or recalled.

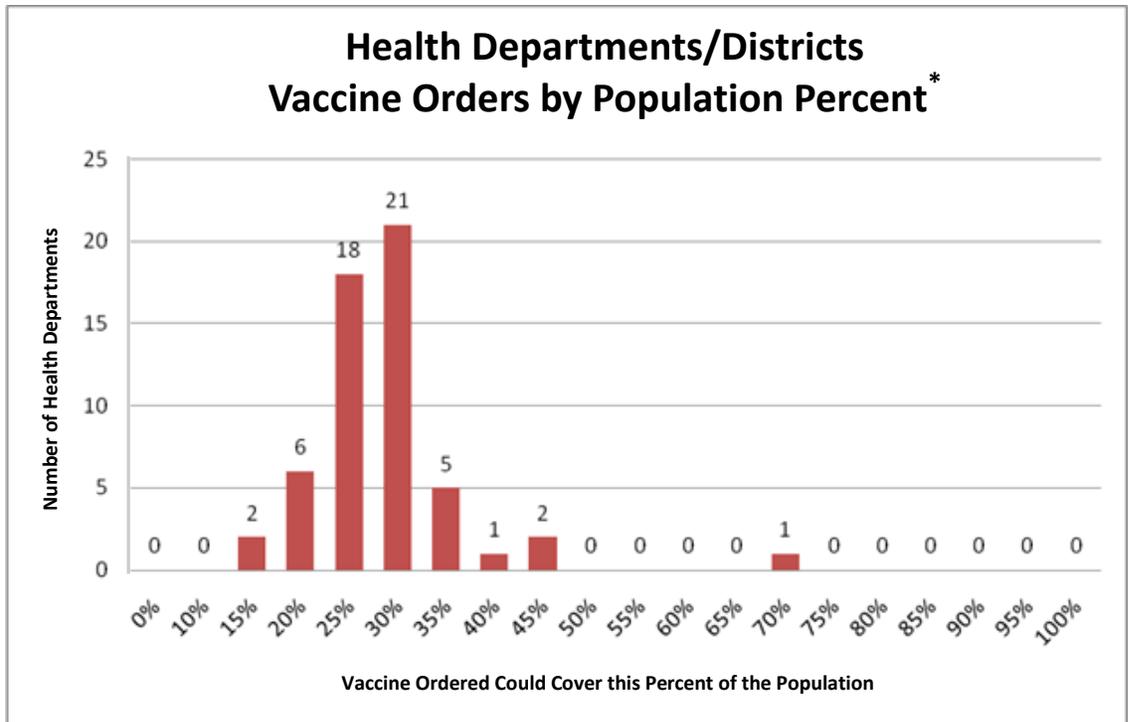
As part of quality assurance efforts, the manufacturers of H1N1 flu vaccine perform routine, ongoing stability testing of their influenza A (H1N1) vaccines during the vaccine's "shelf life," that is after the vaccine has been shipped to providers until its expiration date. Stability testing means measuring the strength (also called potency) of vaccine over time to make sure it does not go down below a pre-specified limit. Potency is determined by the measurement of the concentration of the active component in the H1N1 vaccine.

Vaccines go through years of testing before and after they are approved for use. Sometimes a vaccine or a particular lot (batch) of vaccine may be withdrawn or recalled from doctor's offices, clinics, hospitals, and other places permitted to administer vaccines. During the H1N1 vaccination campaign (late October 2009 to March 2010), there were four primary vaccine recalls. They were: December 15, 2009 (Sanofi Pasteur Pre-filled Syringes for Infants—Decreased Potency, 4 lots), December 22, 2009 (MedImmune Monovalent intranasal spray—Decreased Potency, 13 lots/4.7 million doses), January 29, 2010 (Sanofi Pasteur pre-filled syringes for Infants and one lot of pre-filled syringes for older children and adults), February 2, 2010 (Sanofi Pasteur pre-filled syringes for Infants and pre-filled syringes for older children and adults, 50 lots/12 million doses).

There have been only a few vaccine recalls or withdrawals of H1N1 vaccine, all due to concerns about the vaccine's effectiveness, not its safety. When the strength of a vaccine lot has been recalled, those vaccines may not produce an immune response that is strong enough to protect against disease. Although those vaccines may not be *effective*, they are still *safe*. Vaccines are tested carefully and monitored continuously before and after they are licensed for use. If a vaccine lot is found to be unsafe, the FDA recalls it immediately.

Percent of Population Covered by Vaccine Orders

Local health departments and districts (LHD) varied widely in the amount of vaccine they ordered for their service areas. KDPH allocated vaccine on a per capita basis. CDC ultimately provided enough vaccine to vaccinate about 35% of Kentucky’s population. LHDs had discretion in ordering vaccine based on how much the LHD planned to deliver itself or sub-allocate to local health care providers. One health department ordered enough vaccine to immunize about 70% of the department’s service area. Two health departments only ordered enough vaccine to cover 15% of their service area. Most LHDs ordered enough vaccine to cover about 32% of their population. Those counties with a large proportion of college or university students tended to have higher than average vaccination rates due to the partnership with colleges and universities who vaccinated students in mass vaccination clinics.



*Distribution of the Number of Health Departments/Districts that Ordered Adequate Amounts of Vaccine to Cover Percent of Population Indicated on X-axis

Activation of Strategic National Stockpile

The Centers for Disease Control's Strategic National Stockpile (SNS) has large quantities of medicine and medical supplies to protect the American public if there is a public health emergency severe enough to cause local supplies to run out. Kentucky has its own stockpile of medical and emergency response material and detailed plans for their distribution. Once Federal and Kentucky authorities agree that the SNS is needed, medicines and supplies can be delivered from national stockpiles. During the H1N1 response, Kentucky activated its plan to receive personal protective equipment (PPE) material and antiviral medication from the CDC and distribute material from Kentucky-based stockpiles. This activation occurred between 4/30/2009 through 5/4/2009 and pushed out SNS material to all 56 health department jurisdictions using the state SNS plan. The H1N1 response is the first time Kentucky has activated its Strategic National Stockpile for a statewide response.

Personal protective equipment for biological hazards, including H1N1, includes gowns, masks, and gloves worn by medical personnel to avoid exposing personnel to infection from the patient and to prevent transfer of infection between patients. Personal protective equipment is used to protect individuals against hazards that cannot otherwise be eliminated or controlled. This PPE material came from both Kentucky's and national stockpiles. The PPE went to local health departments for use at the health departments and for further distribution to local health care agencies, to Kentucky State Police, and to Kentucky School Boards for distribution to local education agencies.

For transportation of the PPE, KDPH worked with state agency partners as described in the KDPH SNS transportation plan. The Kentucky State Police aided in the pickup of the PPE material. The Kentucky Transportation Cabinet moved the material to local distribution sites. H1N1 has been a useful test of the SNS system; this test has yielded some important lessons for Kentucky: a need to improve the planning for distribution of material—both shipping and receiving, a need to improve the SNS inventory system, and a continuing need to invest in personnel development.

Kentucky also used the SNS to distribute anti-viral medication. The anti-viral medication came from national stockpiles and went to local pharmacies in every county through the Kentucky Pharmacy Association. The anti-viral medication was provided to persons who were under and uninsured and needed anti-viral medication. Antiviral drugs are medicines that act directly on viruses to stop them from multiplying. Experience in the treatment of pandemic H1N1 virus infections shows the importance of early treatment with the antiviral drugs, oseltamivir or zanamivir. Early treatment is especially important for patients who are at increased risk of developing complications, those who have severe illness or those with worsening symptoms.

Use of ITV to Support Local Health Department

During the H1N1 response the KY Department for Public Health realized the need for effective communication with local health departments. Weekly H1N1 briefings were conducted with local health departments via ITV (Interactive Television) and telephone. The meetings were also recorded to allow those who could not attend an opportunity to receive the information via archived webcast at a time that was convenient.

The agendas were developed based on new information received from CDC, questions from local health departments or general information that KDPH wanted to provide. The agendas were fluid and were updated and redistributed as new information was received prior to the meeting, giving the participants the constant ability to prioritize their H1N1 activities and their attendance in the meetings.

The meetings were normally facilitated by State Epidemiologist Dr. Kraig Humbaugh along with subject matter experts from KDPH. Local health department participants were given opportunities to ask questions, provide suggestions and to initiate discussion on any topic related to the H1N1 response. Activities that were considered Best Practices were also discussed.

Based on the responses received at KDPH, the briefings were an effective way to provide updated information and two-way communication with the local health departments. Having the ITVs available via archived webcast was also important because it allowed everyone an opportunity to receive the information when it was suitable for their health department.

Public Health Works

Every day the state, district, and local health departments in Kentucky conduct essential services in their efforts to prevent disease, promote health, and protect the citizens of Kentucky. Each issue of *Fluview* highlighted how **public health works** in Kentucky by sharing success stories from local health departments' H1N1 response efforts. Below are examples of stories describing best practices of two local health departments in Kentucky. Other 'Public Health Works' stories can be read in previous issues of *Fluview* found on <http://healthalerts.ky.gov/Pages/KentuckyFluView.aspx>.

Bullitt County Health Department: "Feeds" the Masses with Two Fish and Five Loaves of Bread

Just as in most counties, Bullitt County Health Department (BCHD) discovered their response to the H1N1 outbreak would require tailoring of our plan and priorities to the unique local situation. Many of our decisions were based on an educated estimation of the demand, divided by the amount of available vaccine. The question "what can be done with what is given?" was posed frequently. The first step in implementing the pandemic response plan was to build a communications network between healthcare providers, local government, businesses, and schools. Once communication among local constituents was in motion, the BCHD established priorities in the response effort.



The first priority was to enroll providers willing to participate in H1N1 vaccination efforts, and then encourage those providers to build a communication link for information sharing. BCHD worked to enhance vaccine storage capacity and coordinate vaccine distribution, tracking, and reporting of vaccine use. When administering H1N1 vaccine, BCHD's first provided vaccine to first responders and other healthcare workers, followed by other target group populations, school age children, and eventually to anyone who wanted to have the H1N1 vaccine. Vaccine was then distributed to private providers and pharmacies and is still continuously being provided by BCHD clinic.

BCHD saw the impending H1N1 vaccination campaign as an opportunity to exercise the county's mass prophylaxis plans. While vaccinating the target group populations at the BCHD clinic, it quickly became apparent the facility was not large enough to meet the demand. Each year, seasonal flu vaccine is offered at the primary Point of Dispensing (POD) using a miniature POD model. This provides training opportunities for a portion of our staff, but the H1N1 campaign would require an all hands on deck approach and a flu clinic on steroids. Personnel from education, HANDS, administration and environmental all supported the clinic staff at each of our eight PODS. The first advertised clinic for the target group population was conducted over four hours by twenty three personnel. Eight nurses vaccinated a total of 1,586 persons at a thru-put rate of 264 per hour. However, 509 were vaccinated in the first hour, and the longest wait after the doors were opened was thirteen minutes.

The most evident lesson learned by BCHD was to employ multiple methods of providing vaccine to the public. Using all avenues of outreach through the health department, local physicians, and pharmacists offered the greatest opportunity for those seeking vaccination to receive it in a timely and safe manner.

Buffalo Trace District Partners to Develop Mass Vaccination Clinic Training

Preparedness staff from three different health departments in Healthcare Planning Coalition (HPC) Region 8 in NE Kentucky worked together to develop a mass vaccination clinic training for Medical Reserve Corps (MRC) volunteers in preparation for the H1N1 vaccination campaign in the fall of 2009. Paul Fields, Preparedness Coordinator for Buffalo Trace District, Amy Mains, RN, Preparedness Coordinator for Bracken County and Mike Maddox, Regional Training Coordinator from Gateway District collaborated together.

MRC volunteers from four counties attended this training, which was offered on a Saturday morning and then repeated the following Monday evening in mid-October, 2009. Volunteers were given a brief overview of the layout of a typical mass vaccination clinic and a summary of a potential ICS structure for such a clinic. Volunteers were also given a description of the setup and necessary supplies of the vaccination station, the handling and administration of vaccine, safety concerns for vaccinators and techniques for working efficiently.

It was recognized that most MRC nurses had never experienced large-scale vaccination efforts, while public health nurses do it every year with seasonal flu clinics. Those who had experience with mass vaccination clinics were able to give the other volunteers a heads-up on what they could expect. As a result, the volunteers went into the H1N1 clinics better prepared and with less anxiety. As an added bonus, MRC nurses received free contact hours for attending this class. For more information on these efforts, please note the contact information in the left margin.

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Thank you to all the public health responders who made the H1N1 pandemic response a success. The Kentucky Department for Public Health appreciates your hard work!